

Draft Chapter 1

INTRODUCTION

1.0 PURPOSE

The purpose of this Handbook is to provide guidance on the measures necessary to comply with the Virginia Stormwater Management Law and Regulations and protect the waters of the Commonwealth of Virginia from the adverse impacts of post-construction stormwater runoff. The guidance provided in this Handbook is applicable to new development, redevelopment, and upgrades to existing development. The Handbook focuses on environmental site planning and design, pollution source control and prevention, runoff volume reduction, stormwater treatment, stream channel protection, and flood protection. Related topics such as erosion and sediment control and watershed management are addressed in the Handbook as secondary considerations. The Handbook does not address agricultural runoff.

1.1 WHAT IS NEW IN THIS HANDBOOK

The last edition of this Handbook was released in 1999. It has been referred to as the “Blue Book” because of the blue plastic binders that contain the two volumes of information. That Handbook was much more basic, addressing only the most basic and important considerations of stormwater management in Virginia.

This edition not only reflects updated stormwater management regulations, but it also covers the topic of stormwater management more comprehensively. DCR staff incorporated the best information available on each subject area from recent leading state and local stormwater management manuals from around the country. DCR also incorporated the work of leading researchers and journalistic contributors. As a result, the DCR believes this Handbook to be on the cutting edge of guidance about this subject.

Chapter 3, which describes what a locality must do to implement a qualifying stormwater management program (in compliance with the regulations). It also includes a Model Stormwater Management Ordinance as an appendix.

Chapter 4 provides a primer about stormwater, covering important topics such as the hydrologic cycle, the growing scarcity of water, the potential affects of climate change on water availability, the concept of rainwater harvesting, and the consequences of population growth and development on the hydrologic cycle, stormwater runoff, and our freshwater stream and river systems. Taken together, this collection of information describes why our society should care about managing stormwater effectively and what can happen if we don't.

Chapter 5 provides a comprehensive set of recommendations regarding how to manage stormwater most effectively. The recommendations in this chapter extend beyond managing stormwater on land development sites to the more systemic needs of localities with state/federal permits to manage Municipal Separate Storm Sewer Systems (MS4s).

This chapter advocates thinking of the natural drainage system in the same way we think of constructed drainageways, as *infrastructure* – only *Green Infrastructure*.

The new regulations represent a paradigm shift in the approach to managing stormwater runoff from land development projects. Most notably, this approach reflects the thinking of a panel of national experts on the subject of stormwater management, as represented in their 2008 report to the USEPA recommending better ways to manage stormwater (NRC, 2008).

This shift involves focusing primarily on reducing the *volume* of stormwater runoff on the development site, rather than focusing on merely *treating* the pollution in the runoff. Runoff volume reduction accomplishes the full range of stormwater management goals more effectively and efficiently than in the past.

Chapter 6 discusses environmental site design as one of the keys to effectively implementing this new approach, integrating stormwater management into the development site's actual layout, protecting and using the soils and drainageways on the site to capture and infiltrate runoff instead of merely transporting the water off-site. In this respect, the stormwater designer should be part of the original development team, involved in determining how to most effectively manage stormwater on the site *before* the site plan is completed, platted and recorded. This approach can not only result in better runoff management, but it can also significantly reduce site development costs when done well.

Chapter 7 is another new chapter, providing information about how to retrofit stormwater controls to existing developments that had no controls previously, or how to upgrade older stormwater control measures to make them function more effectively. This information is very important for those who are redeveloping urban sites that already have drainage infrastructure in place. The information will also be useful to MS4 localities, who may need to accomplish greater pollution treatment on previously developed lands.

One significant change in the new Handbook is that the design specifications for the various Best Management Practices (BMPs) are *not* incorporated within the Handbook. The BMP specifications have been moved to the **Virginia Stormwater BMP Clearinghouse Web Site**, in order to accomplish several goals:

- To provide easier access to the design specifications
- To allow the Commonwealth to update specifications more quickly and easily
- To allow the Commonwealth to more effectively evaluate and manage the approval of manufactured treatment devices (MTDs) for use in treating stormwater runoff in Virginia

The BMP Clearinghouse web site can be found at <http://www.vwrrc.vt.edu/swc/>. The new design specifications were developed collaboratively by staffs of the Center for Watershed Protection and the Chesapeake Stormwater Network. They reflect the most

recent research on BMPs and the best and most current thinking about BMP sizing, design and performance. There are a number of new specifications included that reflect the Low Impact Development (LID) approach to managing stormwater, including specifications for Vegetated Roofs, Bioretention, and Rainwater Harvesting (with a very sophisticated design spreadsheet).

Even though the BMP design specifications are no longer in the Handbook, **Chapter 8** provides a comprehensive discussion of the hierarchy of stormwater control measures and extensive guidance regarding selecting appropriate BMPs for particular applications and physical settings. This information is also new to the Handbook.

Just as with an automobile, a power tool, or a major appliance, stormwater control measures must be maintained if they are to continue to function effectively over time. As is also true for the car, tool, or appliance, regular preventive maintenance can prevent major failures and repair expenses at some later date. However, it is more typical that stormwater controls have been ignored following their construction, and needed maintenance has not been performed, resulting in failure of these devices to perform. Thus, the controls that were intended to manage both the amount and quality of site runoff to protect our local stream systems and drinking water supplies do *not* accomplish those purposes.

Chapter 9, another new chapter, provides extensive information about effective inspection and maintenance of stormwater control measures. This chapter includes graphic examples of what happens when specific practices are not maintained, as well as describing the most common maintenance mistakes. The chapter also includes example inspection and maintenance checklists and BMP maintenance agreements.

The set of engineering-related chapters in the 1999 Handbook are still included. However, they have been edited to reflect the new regulatory criteria. As well, there is a new **Chapter 13** that focuses specifically on the new Runoff Reduction Methodology (MS-Excel Spreadsheet) that the DCR requires to be used to calculate the required pollution load removal and demonstrate compliance with the water quality criteria of the regulations.

The Handbook provides an expanded Glossary of Terms in Appendix A of this chapter. Also, the reader will see more photographs and graphics to illustrate points being made in the text. Most chapters include appendices additional helpful information or “tools,” such as checklists, reference tables, etc. And finally, each chapter includes a list of helpful reference documents.

1.2 HOW TO USE THIS HANDBOOK

The new Handbook is organized in a logical progression. Therefore, the Handbook can be used in an academic approach to methodically gain an understanding of the subject matter. Even so, each chapter is self-contained, so the reader can turn to specific topics independently, depending upon the type of information or guidance needed. There are

comprehensive indexes at the beginning of each chapter showing the location of specific topics, figures and tables.

Part I includes chapters 1-3. These chapters introduce the Handbook and provide copies of the law and regulations, the model ordinance, and guidance about how to implement an effective local stormwater management program. Part II, including chapters 4-7, provides information to help the reader develop a conceptual understanding of why stormwater management is important and what is involved. Part III, including chapters 8-14, provides more specific tools, methods and examples for designers, local program staffs, etc., to enable them to translate the concepts into specific plans that will result in control measures on the ground, including their long-term inspection and maintenance.

This Handbook is obviously aimed at information that supports implementation of and compliance with Virginia's stormwater management law and regulations. However, the BMP design specifications on the BMP Clearinghouse web site, have been designed to apply throughout the Chesapeake Bay/Mid-Atlantic region. However, there is a lot more information available about stormwater management that is covered in this Handbook or our design standards, including alternative approaches, different technical standards, etc.

Appendix 1-A

Glossary of Terms and Acronyms

Key:

Original Text

From the Regulations

~~Deleted Text~~

From Scott Crafton

Waiting for a Virginia Definition

From Maryland Handbook

From Pennsylvania Handbook

From Vermont Stormwater Treatment Standards

From CNMI/Guam Stormwater Management Manual-Draft Volume I - Glossary

Northern Shenandoah Valley Regional LID Manual Glossary

Note: the Minnesota Handbook and the Maryland Handbook are nearly identical

A

AASHTO - American Association of State and Highway Transportation Officials

access and egress control reinforced or rocked entrance and exit points to the site to deter tracking of sediment off the site onto adjacent streets

Act - The Virginia Stormwater Management Act, Article 1.1 (§ 10.1-603.1 et seq.) of Chapter 6 of Title 10.1 of the Code of Virginia.

active karst areas underlain by carbonate bedrock with less than 50 feet of sediment cover

Adequate channel - A watercourse or wetland that will convey the designated frequency storm event without overtopping its banks or causing erosive damage to the bed, banks or overbank sections of the same.

Administrator - The Administrator of the United States Environmental Protection Agency or an authorized representative.

Adsorption - The process by which a solute is attracted to a solid surface. Adsorption is the process utilized in stormwater management BMPs to enhance the removal of soluble pollutants.

aggrade the build up of sediment or eroded material

alkalinity – A measure of the capacity of water to neutralize acids because of the presence of one or more of the following bases in the water: carbonates, bicarbonates, hydroxides, borates, silicates, or phosphates.

ammonia nitrogen (NH₄-N) – A reduced form of nitrogen produced as a by-product of organic matter decomposition and synthesized from oxidized nitrogen by biological and physical processes.

anaerobic condition operating in a system where there is the absence of free oxygen available for biologic use.

animal waste management practices and procedures which prevent the movement of animal wastes or byproducts from feeding or holding areas into the wider environment.

annual load quantity of pollutants, sediment, or nutrients carried by a water body over the period of a year

antecedent soil moisture the water content held by a soil before a storm event. This has an effect on the amount of water that will runoff due to that event.

Anti-seep collar - A device constructed around a pipe or other conduit and placed into a dam, levee, or dike for the purpose of reducing seepage losses and piping failures along the conduit it surrounds.

Anti-vortex device - A device placed at the entrance to a pipe conduit structure to help prevent swirling action and cavitation from reducing the flow capacity of the conduit system.

Applicable standards and limitations - All state, interstate, and federal standards and limitations to which a discharge or a related activity is subject under the Clean Water Act (CWA) (33 USC §1251 et seq.) and the Act, including effluent limitations, water quality standards, standards of performance, toxic effluent standards or prohibitions, best management practices, and standards for sewage sludge use or disposal under §§301, 302, 303, 304, 306, 307, 308, 403 and 405 of CWA.

APPLICANT - A person applying for permit coverage. In some cases, more than one person may apply as co-applicants.

Approval authority - The Virginia Soil and Water Conservation Board or their designee.

Approved program (approved state) - A state or interstate program that has been approved or authorized by EPA under 40 CFR Part 123 (2000).

Aquatic bench - A 10- to 15-foot wide bench around the inside perimeter of a permanent pool that ranges in depth from zero to 12 inches. Vegetated with emergent plants, the bench augments pollutant removal, provides habitats, protects the shoreline from the effects of water level fluctuations, and enhances safety.

Aquifer - A porous, water bearing geologic formation generally restricted to materials capable of yielding an appreciable supply of water.

As-built (drawing) - Drawing or certification of conditions as they were actually constructed.

aspect ratio – Ratio of wetland cell length to width.

atmospheric controls reducing or removing wind erosion, dust, or statutory emissions regulations

Atmospheric Deposition - The process by which atmospheric pollutants reach the land surface either as dry deposition or as dissolved or particulate matter contained in precipitation.

attenuation – Reduction in magnitude, as in the lowering of peak runoff discharge rates, in the case of dry ponds; or the reduction of contaminant concentrations, as in the action of biodegradation in wetlands or bioretention facilities.

AUTHORIZATION TO DISCHARGE - An authorization to discharge issued by the Secretary pursuant to a general permit.

Average land cover condition - The percentage of impervious cover considered to generate an equivalent amount of phosphorus as the total combined land uses within the Chesapeake Bay watershed at the time of the Chesapeake Bay Preservation Act adoption, assumed to be 16%. Note that a locality may opt to calculate actual watershed specific values for the average land cover condition based upon 4VAC 3-20-101.

Average monthly discharge limitation - The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average weekly discharge limitation - The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

B

Baffle - Guides, grids, grating or similar devices placed in a pond to deflect or regulate flow and create a longer flow path from the inlet to the outlet structure.

bank stabilization activities undertaken to shore up or ensure the integrity of a stream or river bank and protect it from erosion and slumping.

Bankfull flow - Condition where flow fills a stream channel to the top of bank and at a point where the water begins to overflow onto a floodplain.

Barrel - Closed conduit used to convey water under or through an embankment, part of the principal spillway.

Base flow - Discharge of water independent of surface runoff conditions, usually a function of groundwater levels.

Basin - A facility designed to impound stormwater runoff.

bed load the sand, gravel or rocks which are transported along the stream bottom by traction, rolling, sliding or saltation

bedrock – Layer of consolidated rock over which lies an overburden of soil (regolith), including unconsolidated rock.

benthic – Pertaining to occurrence on or in the bottom sediment of wetland and aquatic ecosystems, including wetlands.

BERM - A shelf that breaks the continuity of a slope; a linear embankment or dike.

Best management practice (BMP) - Schedules of activities, prohibitions of practices, including both a structural or nonstructural practice, maintenance procedures, and other management practices to prevent or reduce the pollution of surface waters and groundwater systems from the impacts of land-disturbing activities. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Better Assessment Science Integrating Point and Nonpoint Sources (BASINS) a multipurpose environmental analysis system developed by the U.S. Environmental Protection Agency for water quality modeling purposes.

better site design (BSD) the application of non-structural practices at residential and commercial sites to reduce impervious cover, conserve natural areas, and use pervious areas to more effectively treat stormwater runoff.

Biochemical Oxygen Demand (BOD) - An indirect measure of the concentration of biologically degradable material present in organic wastes. It usually reflects the amount of oxygen consumed in five days by biological processes breaking down organic waste.

biodiversity – The number of species of plants and animals in a defined area. Biodiversity is measured by a variety of indices that consider the number of species and, in some cases, the distribution of individuals among species.

biological additives products which are formulated with specialized bacteria, enzymes, or other living components that can be added to boost pollution treatment efficiencies, eg. chitosan

Biological Processes - A pollutant removal pathway in which microbes break down organic pollutants and transform nutrients.

biomass – The total mass of living tissues (plant and animal).

BIORETENTION - A water quality practice that utilizes landscaping and soils to treat urban stormwater runoff by collecting it in shallow depressions, before filtering through a fabricated planting soil media.

Bioretention – The use of vegetation in retention areas designed to allow infiltration of runoff into the ground and transpiration by plants as well as evaporation. The plants provide additional pollutant removal and filtering functions while infiltration allows the temperature of the runoff to be cooled. Also referred to as a Biofilter or Rain Garden.

Bioretention basin - Water quality BMP engineered to filter the water quality volume through an engineered planting bed, consisting of a vegetated surface layer (vegetation, mulch, ground cover), planting soil, and sand bed (optional), and into the in-situ material. Also called rain gardens.

Deleted: Best Management Practice (BMP) - Structural or nonstructural practice which is designed to minimize the impacts of changes in land use on surface and groundwater systems. Structural BMP refers to basins or facilities engineered for the purpose of reducing the pollutant load in stormwater runoff, such as Bioretention, constructed stormwater wetlands, etc. Nonstructural BMP refers to land use or development practices which are determined to be effective in minimizing the impact on receiving stream systems, such as preservation of open space and stream buffers, disconnection of impervious surfaces, etc.

Bioretention filter - A bioretention basin with the addition of a sand layer and collector pipe system beneath the planting bed.

BMP fingerprinting – A series of techniques for locating BMPs (particularly ponds) within a development site so as to minimize their impacts to wetlands, forest, and sensitive stream reaches.

Board - The Virginia Soil and Water Conservation Board.

BOD₅ – Five-day biochemical oxygen demand.

bog a poorly drained, surface water fed, acidic area rich in accumulated plant material

bounce water level fluctuations due to topography, soils, and runoff inputs during and after precipitation events.

buffers a vegetative setback between development and streams, lakes, and wetlands whose aim is to physically protect and separate the resource from future disturbance or encroachment

Bypass - The intentional diversion of waste streams from any portion of a treatment facility.

C

calcareous fen a peat-accumulating wetland dominated by distinct ground- water inflows which is circum-neutral to alkaline and has high concentrations of calcium and low dissolved oxygen. The rarest wetland plant community in Minnesota.

Catch Basin - An inlet chamber usually built at the curb line of a street or low area, for collection of surface runoff and admission into a sewer or subdrain. These structures commonly have a sediment sump at its base, below the sewer or subdrain discharge elevation, designed to retain solids below the point of overflow.

catch basin insert devices that attach to the entrance of a catch basin or mount inside the catch basin. They are designed to improve stormwater quality by either preventing debris and pollutants from entering the basin, or by retaining or treating the water in the basin.

CBLAD - Chesapeake Bay Local Assistance Department (Virginia state agency).

Channel - A natural stream or manmade watercourse with defined bed and banks that conducts continuously or periodically flowing water.

~~Channel~~—A natural or manmade waterway.

channel protection actions taken to prevent habitat degradation and erosion that may cause downstream enlargement and incision in urban streams due to increased frequency of bankfull and sub-bankfull stormwater flows.

Channel stabilization - The introduction of natural or manmade materials placed within a channel so as to prevent or minimize the erosion of the channel bed and/or banks.

channelization – The creation of a channel or channels resulting in faster water flow, a reduction in hydraulic residence time, and less contact between water and solid surfaces in the water body.

Check dam - Small dam constructed in a channel for the purpose of decreasing the flow velocity, minimize channel scour, and promote deposition of sediment. Check dams are a component of grassed swale BMPs.

chemical controls includes such activities as salt management, fertilizer/pesticide management, and spill prevention and containment.

Chemical Oxygen Demand (COD) - A measure of the oxygen required to oxidize all compounds, both organic and inorganic, in water.

chemical treatment removal of pollutant from the water column via chemical means, eg. Ferric chloride, alum, polyacrylamides

choker course – A filter layer of finer material, usually crushed stone, that is installed over a coarse road base material. The purpose of the choker course is to provide a stable foundation for the construction of a pavement.

Chute - A high velocity, open channel for conveying water to a lower level without erosion.

Cistern – A receptacle for holding water or other liquid (i.e. tank for catching and storing rainwater).

cistern a technique which captures and temporarily stores rooftop runoff at confined sites, gradually releasing it over pervious areas.

CLAY (SOILS) - 1. A mineral soil separate consisting of particles less than 0.002 millimeter in equivalent diameter. 2. A soil texture class. 3. (Engineering) A fine-grained soil (more than 50 percent passing the No. 200 sieve) that has a high plasticity index in relation to the liquid limit. (Unified Soil Classification System)

CLEAN WATER ACT - The federal Clean Water Act, 33 U.S.C.A. §1251 et. seq.

cluster design a reduction of average lot size within a residential development in exchange for greater conservation of natural areas.

COCONUT ROLLS - Also known as coir rolls, these are rolls of natural coconut fiber designed for use in streambank stabilization.

COE - United States Army Corps of Engineers

coincident peaks upstream peak discharge arriving at the same time a downstream structure releases its peak discharge thus increasing the total discharge well above what it was on the pre-development hydrograph.

cold climate sizing sizing of stormwater practices to accommodate snowmelt. This is larger than rainfall-based criteria sizing in Minnesota since snowfall represents more than 10% of the annual precipitation.

COMMERCIAL CONTAINER NURSERY - A commercial nursery that grows herbaceous plants, shrubs, and trees in containers on their lot rather than in the ground.

Compaction - The process by which soil grains are rearranged so as to decrease void space and bring them in closer contact with one another, thereby reducing the permeability and increasing the soils unit weight, and shear and bearing strength.

Comprehensive stormwater management plan - A plan, which may be integrated with other land use plans or regulations, that specifies how the water quality and quantity components of stormwater are to be managed on the basis of an entire watershed or a portion thereof. The plan may also provide for the remediation of erosion, flooding, and water quality and quantity problems caused by prior development.

computable pollutant a pollutant for which enough runoff concentration and BMP performance data is available to perform a site-based pollutant load calculation documenting no increase in loading.

Conduit - Any channel intended for the conveyance of water, whether open or closed.

conservation easement a restriction placed on a piece of property to protect the resources associated with the parcel. The easement is either voluntarily sold or donated by the landowner, and constitutes a legally binding agreement that prohibits certain types of development from taking place on the land.

Constructed stormwater wetlands - Areas intentionally designed and created to emulate the water quality improvement function of wetlands for the primary purpose of removing pollutants from stormwater.

Construction activity - Any clearing, grading, or excavation associated with large construction activity or associated with small construction activity.

construction sequencing a specified work schedule that coordinates the timing of land-disturbing activities and the installation of erosion-protection and sedimentation-control measures

Contiguous zone - The entire zone established by the United States under Article 24 of the Convention on the Territorial Sea and the Contiguous Zone (37 FR 11906).

Continuous discharge - A discharge which occurs without interruption throughout the operating hours of the facility, except for infrequent shutdowns for maintenance, process changes, or other similar activities.

Contour - A line representing a specific elevation on the land surface or a map.

Contributing Drainage Area (CDA) -

Control measure - Any best management practice or other method used to prevent or reduce the discharge of pollutants to surface waters.

Co-operator - An operator of a VSMP permit that is only responsible for permit conditions relating to the discharge for which it is the operator.

Conventional (centralized) Best Management Practices (BMPs) – Structural BMPs designed to capture and treat stormwater runoff from a large drainage area. SWM ponds and basins located at the bottom of a developed drainage area or watershed are generally considered to be conventional (centralized) BMPs.

conveyance a structure or feature used for transferring water from one location to another

CORE TRENCH - A trench, filled with relatively impervious material intended to reduce seepage of water through porous strata.

covered karst areas underlain with carbonate bedrock with more than 100 feet of sediment cover

Cradle - A structure usually of concrete shaped to fit around the bottom and sides of a conduit to support the conduit, increase its strength and, in dams, to fill all voids between the underside of the conduit and soil.

Crest - The top of a dam, dike, spillway or weir, frequently restricted to the overflow portion.

critical depth – The depth of flow at which the specific energy is a minimum for a given discharge rate. Flow is critical when the Froude number is equal to one: where V , is the velocity of the flow, g , is the gravitational constant, and D , is the hydraulic depth of the flow.

CRUSHED STONE - Aggregate consisting of angular particles produced by mechanically crushing rock.

Curbs – Concrete barriers on the edges of streets used to direct storm water runoff to an inlet or storm drain and to protect lawns and sidewalks from vehicles.

curb and gutter system edging along the side of streets meant to quickly convey stormwater runoff from the street and adjacent areas into the stormwater system

Curve number (CN) - A numerical representation of a given area's hydrologic soil group, plant cover, impervious cover, interception and surface storage derived in accordance with Natural Resource Conservation Service methods. This number is used to convert rainfall depth into runoff volume. Sometimes referred to as Runoff Curve Number.

Cut - A reference to an area or material that has been excavated in the process of a grading operation.

CUT-AND-FILL - Process of earth moving by excavating part of an area and using the excavated material for adjacent embankments or fill areas.

CUTOFF - A wall or other structure, such as a trench, filled with relatively impervious material intended to reduce seepage of water through porous strata.

CWA - The federal Clean Water Act (33 USC §1251 et seq.), formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972, Public Law 92-500, as amended by Public Law 95-217, Public Law 95-576, Public Law 96-483, and Public Law 97-117, or any subsequent revisions thereto.

CWA and regulations - The Clean Water Act (CWA) and applicable regulations promulgated thereunder. For the purposes of this chapter, it includes state program requirements.

D

Daily discharge - The discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the average measurement of the pollutant over the day.

Dam - A barrier constructed for the purpose of confining or impounding water.

DCR - Virginia Department of Conservation and Recreation.

dead storage the permanent storage volume of a pond

degrade downcutting where softer material is present in a stream channel

denitrification – The removal of nitrate ions from soil or water, anaerobic microbial reduction of oxidized nitrate nitrogen to nitrogen gas.

dense graded material – Granular mixture characterized by a large range in particle sizes. Dense graded materials have superior structural properties to open graded materials. However, they are less permeable.

densimetric stratification impairment of vertical mixing and oxygenation of bottom water layers

Department - The Department of Conservation and Recreation.

DEQ - Virginia Department of Environmental Quality.

Design Storm - A selected rainfall hyetograph of specified amount, intensity, duration and frequency that is used as a basis for design.

Detain – To store and slowly release storm water runoff following precipitation by means of a surface depression or tank and an outlet structure. Detention structures are commonly used for pollutant removal, water storage, and peak flow reduction.

Detention - The temporary impoundment or holding of stormwater runoff.

Detention Basin - A stormwater management facility which temporarily impounds runoff and discharges it through a hydraulic outlet structure to a downstream conveyance system. While a certain amount of outflow may also occur via infiltration through the surrounding soil, such amounts are negligible when compared to the outlet structure discharge rates and, therefore, are not considered in the facility's design. Since an extended detention basin impounds runoff only temporarily, it is normally dry during nonrainfall periods. See MS 3.08.

DETENTION STRUCTURE - A structure constructed for the purpose of temporary storage of stream flow or surface runoff and gradual release of stored water at controlled rates.

detention time the theoretical calculated time that a small amount of water is held in a settling basin.

detritus – Dead plant material that is in the process of microbial decomposition.

Development - Land disturbance and the resulting landform associated with the construction of residential, commercial, industrial, institutional, recreation, transportation or utility facilities or structures.

DIAPHRAGM - A stone trench filled with small, washed rounded limestone aggregate used as pretreatment and inflow regulation in stormwater filtering systems.

Dike - An embankment, usually linear, to confine or direct water.

Direct discharge - The discharge of a pollutant.

Direct Effects – Those effects that are measured or quantified with analytical methods to identify the hydrologic or hydraulic response of the site to the post-development condition or the SWM strategy or technique. For example, the direct effect of providing on-site storage is that the rate of peak discharge.

Director - The Director of the Department of Conservation and Recreation or his designee.

Discharge - When used without qualification, means the discharge of a pollutant.

Discharge of a pollutant – 1) Any addition of any pollutant or combination of pollutants to surface waters from any point source; or 2) Any addition of any pollutant or combination of pollutants to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation. This definition includes additions of pollutants into surface waters from: surface runoff that is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a state, municipality, or other person that do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works. This term does not include an addition of pollutants by any indirect discharger.

Discharge Monitoring Report (DMR) - The form supplied by the department, or an equivalent form developed by the operator and approved by the board, for the reporting of self-monitoring results by operators.

Deleted: Discharge - Flow of water across the land surface or within the confines of a natural or manmade channel, or stream.

Disconnected impervious area

disconnection technique to spread runoff generated from rooftops or impervious surfaces into adjacent pervious areas where it can be filtered and infiltrated.

Dissolved Oxygen - A form of oxygen found in water that is essential to the life of aquatic species.

DISTRIBUTED RUNOFF CONTROL (DRC) - A stream channel protection criteria which utilizes a nonuniform distribution of the storage stage-discharge relationship within a STP to minimize the change in channel erosion potential from predeveloped to developed conditions.

DISTURBANCE – Removal of stable surface treatment leaving exposed soil susceptible to erosion.

Disturbed area - An area in which the natural vegetative soil cover or existing surface treatment has been removed or altered and, therefore, is susceptible to erosion.

diurnal – Occurring daily or during the daylight.

Diversion - A channel or dike constructed to direct water to areas where it can be used, treated, or disposed of safely.

Draft permit - A document indicating the board's tentative decision to issue or deny, modify, revoke and reissue, terminate, or reissue a permit. A notice of intent to terminate a permit, and a notice of intent to deny a permit are types of draft permits. A denial of a request for modification, revocation and reissuance, or termination is not a draft permit. A proposed permit is not a draft permit.

DRAINAGE - 1. The removal of excess surface water or ground water from land by means of surface or subsurface drains. 2. Soils characteristics that affect natural drainage.

Drainage area - A land and water area on a land disturbing site from which runoff flows to a common outlet point.

Drainage basin - An area of land that contributes stormwater runoff to a designated point. Also called a drainage area or, on a larger scale, a watershed.

Drop structure - A manmade device constructed to transition water to a lower elevation.

dry pond a water bearing stormwater management facility that controls peak runoff flows to receiving bodies such as rivers and streams which is typically free of water during dry periods, but filled during times of rainfall

DRY SWALE - An open drainage channel explicitly designed to detain and promote the filtration of stormwater runoff through an underlying fabricated soil media.

dry well a deep covered hole acting as an underground storage facility for stormwater until it seeps into the surrounding soil.

Dry Well – Small excavated trenches filled with stone to control and infiltrate runoff, usually from rooftops.

Duration - The length of time over which precipitation occurs.

E

ecosystem – All organisms and the non-living environmental factors with which they interact.

ecotone – The boundary between adjacent ecosystem types. An ecotone can include environmental conditions that are common to both neighboring ecosystems and can have higher species diversity.

Effective impervious area or **directly connected impervious area** - An impervious surface that drains directly to a sealed drainage system.

Effluent limitation - Any restriction imposed by the board on quantities, discharge rates, and concentrations of pollutants which are discharged from point sources into surface waters, the waters of the contiguous zone, or the ocean.

Effluent limitations guidelines - A regulation published by the administrator under §304(b) of the CWA to adopt or revise effluent limitations.

Eh – A measure of the reduction-oxidation (redox) potential of soil according to a hydrogen scale

Eligibility Criteria are defined as design factors - such as sizing, pretreatment, flow path geometry, vegetative condition, and treatment processes - that allow a BMP to achieve the RR and PR rates assigned in this document.

elution washing out of ions in solution from a snowpack

Embankment - A man-made deposit of soil, rock or other material used to form an impoundment.

Emergency Spillway - A channel, usually an open channel constructed adjacent to an embankment, which conveys flows in excess of the design capacity of the principal spillway.

emergent plant – A rooted, vascular plant that grows in periodically or permanently flooded areas and has parts of the plant (stems and leaves) extending through and above the water plane.

Energy dissipator - A device used to reduce the velocity or turbulence of flowing water.

Environmental Protection Agency (EPA) - The United States Environmental Protection Agency.

Erosion - The wearing away of the land surface by running water, wind, ice or other geological agents.

Accelerated erosion - erosion in excess of what is presumed or estimated to be naturally occurring levels and which is a direct result of human activities.

Gully erosion - erosion process whereby water accumulates in narrow channels and removes the soil to depths ranging from a few inches to 1 or 2 feet to as much as 75 to 100 feet.

Rill erosion - erosion process in which numerous small channels only several inches deep are formed.

Sheet erosion - spattering of small soil particles caused by the impact of raindrops on wet soils. The loosened and spattered particles may subsequently be removed by surface runoff.

Erosion and Sediment Control (ESC) Plan – A document that is prepared in accordance with good engineering practices and containing details and instructions for the conservation of soil and water resources of a unit or group of units of land during land disturbing activities.

erosion control any efforts to prevent the wearing or washing away of the soil or land surface

erosion control blanket a natural or geotextile mat placed in areas susceptible to erosion to hold the soil in place until it can be permanently stabilized through vegetation or armoring

EROSIVE VELOCITIES - Velocities of water that are high enough to wear away the land surface. Exposed soil will generally erode faster than stabilized soils. Erosive velocities will vary according to the soil type, slope, structural, or vegetative stabilization used to protect the soil.

eutrophic an environment which has an excessive concentration of nutrients

Eutrophication - The process of over-enrichment of water bodies by nutrients often typified by the presence of algal blooms.

evaporation the process of changing from a liquid state into a gas

Evaporation – The process of liquid water becoming water vapor, including vaporization from water surfaces, land surfaces.

Evapotranspiration – The combination of evaporation and transpiration of water into the atmosphere from living plants and soil.

evapotranspiration loss of water to the atmosphere as a result of the joint processes of evaporation and transpiration through vegetation

event-based load quantity of pollutants, sediment, or nutrients carried by a water body for particular magnitude storm events

excessively rapid drainage - For purposes of this manual, corresponds to infiltration rates of soils in excess of 6 inches per hour. (Normally 6 inches is considered rapid drainage but the manual indicates that special precautions need to be taken with an infiltration rate of 6 inches per hour or more).

Exfiltration - The downward movement of runoff through the bottom of a stormwater facility and into the soil.

EXISTING IMPERVIOUS SURFACE - An impervious surface that is in existence, regardless of whether it ever required a stormwater discharge permit.

Existing permit - or the purposes of this chapter a permit issued by the permit-issuing authority and currently held by a permit applicant.

Existing source - Any source that is not a new source or a new discharger.

EXISTING STORMWATER DISCHARGE - A discharge of regulated stormwater runoff which first occurred prior to June 1, 2002 and that is subject to the permitting requirements of 10 V.S.A. Chapter 47.

exotic species – A plant or animal species that has been intentionally or accidentally introduced and that does not naturally occur in a region.

EXPANSION AND EXPANDED PORTION OF AN EXISTING DISCHARGE - An increase or addition of new impervious surface to an existing impervious surface, such that the total resulting impervious surface is greater than the minimum regulatory threshold.

EXTENDED DETENTION (ED) - A stormwater design feature that provides for the gradual release of a volume of water over a 12 to 48 hour interval in order to increase settling of urban pollutants and protect downstream channels from frequent storm events.

Extended detention basin - A stormwater management facility, which temporarily impounds runoff and

discharges it through a hydraulic outlet structure over a specified period of time to a downstream conveyance system for the purpose of water quality enhancement or stream channel erosion control. While a certain amount of outflow may also occur via infiltration through the surrounding soil, such amounts are negligible when compared to the outlet structure discharge rates and, therefore, are not considered in the facility's design. Since an extended detention basin impounds runoff only temporarily, it is normally dry during nonrainfall periods.

Extended detention basin-enhanced - An extended detention basin modified to increase pollutant removal by providing a shallow marsh in the lower stage of the basin.

extensive green roof xeriscape type plantings in shallow, draughty growing medium typically on urban rooftops

extreme event an 100-year, 24-hour rain event or an 100-year, 10-day snowmelt event or greater

extreme flood control for the 100-year, 24-hour or larger events, to maintain the boundaries of the pre-development 100-year floodplain, reduce flooding risks to life, reduce property damage, and protect the physical integrity of the stormwater management practices.

F

Facilities or equipment - Buildings, structures, process or production equipment or machinery that form a permanent part of a new source and that will be used in its operation, if these facilities or equipment are of such value as to represent a substantial commitment to construct. It excludes facilities or equipment used in connection with feasibility, engineering, and design studies regarding the new source or water pollution treatment for the new source.

Facility or activity - Any VSMP point source or treatment works treating domestic sewage or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the VSMP.

fascine – Bundled willow cuttings used to stabilize stream banks. Bundling allows otherwise weak green twigs to reinforce each other and resist the forces of stream currents.

fen a peat accumulating wetland that receives some drainage from surrounding mineral soils and usually supports marsh-like vegetation. Richer in nutrients and less acidic than bogs due to ground water inflows.

ferrocyanide an anti-caking additive to road salt; when converted to its free cyanide form (FCN) becomes extremely toxic to aquatic life

field capacity – The quantity of water which will not freely drain from the root zone of shallow soil layers. Usually measured as the moisture content (by volume) in soil at a capillary tension of .33 bars.

Fill - A reference to an area or material that has been placed by mechanical equipment in the process of a grading operation.

Filter bed - The section of a constructed filtration device that houses the filtering media.

FILTER FENCE - A geotextile fabric designed to trap sediment and filter runoff.

FILTER MEDIA - The sand, soil, or other organic material in a filtration device used to provide a permeable surface for pollutant and sediment removal.

Filter Strip - An area of vegetation, usually adjacent to a developed area, constructed to remove sediment, organic matter, and other pollutants from runoff in the form of sheet flow.

filtration a series of processes that physically removes particles from water

FINES (SOIL) - Generally refers to the silt and clay size particles in soil.

First flush - The first portion of runoff, usually defined as a depth in inches, considered to containing the highest pollutant concentration resulting from a rainfall event.

flash boards – Removable boards used in a weir to control water levels.

floating aquatic plant - A rooted or non-rooted vascular plant that is adapted to have some plant organs (generally the chlorophyll-bearing leaves) floating on the surface of the water in wetlands, lakes, and rivers.

Flood fringe - The portion of the floodplain outside of the floodway, usually associated with standing rather than flowing water, which is covered by floodwater during the 100-year discharge.

Flooding - A volume of water that is too great to be confined within the banks or walls of the stream, water body, or conveyance system and that overflows onto adjacent lands, thereby causing or threatening damage.

Floodplain - Any land area adjoining a channel, river, stream, or other water body that is susceptible to being inundated by water. It includes the floodway and flood-fringe areas.

Floodway - The channel of a river or other watercourse and the adjacent land areas, usually associated with flowing water, that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot or as otherwise designated by the Federal Emergency Management Agency.

flow control controlling the rate and volume of water leaving a site

Flow splitter - An engineered hydraulic structure designed to divert a portion of storm flow to a BMP located out of the primary channel, or to direct stormwater to a parallel pipe system, or to bypass a portion of baseflow around a BMP.

Forebay - Storage space, commonly referred to as a sediment forebay, located near a stormwater BMP inlet that serves to trap incoming coarse sediments before they accumulate in the main treatment area.

Freeboard - Vertical distance between the surface elevation of the design high water and the top of a dam, levee, or diversion ridge.

freeze-thaw cycle the alternation between freezing and thawing in the snowpack. This cycle changes the composition and characteristics of the snowpack and can effect its pollutant carrying ability and the amount of runoff generated

French drain - A type of drain consisting of an excavated trench filled with pervious material such as coarse sand, gravel or crushed stone, through whose voids water percolates and exfiltrates into the soil.

Deleted: Flooding - When the volume or rate flow exceeds the capacity of the natural or manmade conveyance system and overflows onto adjacent lands, causing or threatening damage.¶

Floodplain - For a given flood event, that area of land adjoining a continuous water course which has been covered temporarily by water. ¶

Frequency (design storm frequency) - The recurrence interval of storm events having the same duration and volume. The frequency of a specified design storm can be expressed either in terms of exceedence probability or return period.

Exceedence probability - The probability that an event having a specified volume and duration will be exceeded in one time period, usually assumed to be one year. If a storm has a one percent chance of occurring in any given year, then it has an exceedence probability of 0.01.

Return period - The average length of time between events having the same volume and duration. If a storm has a one percent chance of occurring in any given year, then it has a return period of 100 years.

frequency curve A derivative of the probability curve that expresses the relation between the frequency distribution plot, with the magnitude of the variables on one axis and the number of occurrences of each magnitude in a given period as the other

fresh water – Water with a total dissolved solids content less than 500 mg/L (0.5 parts per thousand salts).

frost heave a phenomenon in cold areas in which water that is trapped in soil or cracks in rocks alternately freezes and thaws. This causes the water to expand and contract which can cause significant movement and upheaval of the soil or rock

functional components approach an approach where basic BMP components are selected and pieced together to achieve a desired outcome

G

Gabion - A flexible woven wire basket composed of rectangular cells filled with large cobbles or riprap. Gabions may be assembled into many types of structures such as revetments, retaining walls, channel liners, drop structures, diversions, check dams, and groins.

GABION MATTRESS - A thin gabion, usually six or nine inches thick, used to line channels for erosion control.

General permit - A VSMP permit authorizing a category of discharges under the CWA and the Act within a geographical area.

geomorphology the study of the form and development of the landscape

geotextile – A fabric manufactured from synthetic fiber that is designed to achieve specific engineering objectives, including seepage control, media separation (e.g., between sand and soil), filtration, or the protection of other construction elements such as geomembranes.

GIS - Geographic Information System. A method of overlaying spatial land and land use data of different kinds. The data are referenced to a set of geographical coordinates and encoded in a computer software system. GIS is used by many localities to map utilities and sewer lines and to delineate zoning areas.

gleyed a blue-gray, sticky, compacted soil, usually indicative of saturated conditions

global warming the progressive gradual rise of the Earth's surface temperature thought to be caused by the greenhouse effect, which may be responsible for changes in global climate patterns

Grade - The slope of a specific surface of interest such as a road, channel bed or bank, top of embankment, bottom of excavation, or natural ground. Grade is commonly measured in percent (unit of measurement per one hundred units) or a ratio of horizontal to vertical distance.

grade breaks point where the ground slope changes

grass channels a natural open channel conveyance system which is preferable to curb and gutter where development density, soils, and slopes permit

Grassed swale - An earthen conveyance system which is broad and shallow with check dams and vegetated with erosion resistant and flood tolerant grasses, engineered to remove pollutants from stormwater runoff by filtration through grass and infiltration into the soil.

GRAVEL - 1. Aggregate consisting of mixed sizes of 1/4 inch to 3-inch particles that normally occur in or near old streambeds and have been worn smooth by the action of water. 2. A soil having particle sizes, according to the Unified Soil Classification System, ranging from the No. 4 sieve size angular in shape as produced by mechanical crushing.

GRAVEL DIAPHRAGM - A stone trench filled with small, river-run gravel used as pretreatment and inflow regulation in stormwater filtering systems.

GRAVEL FILTER - Washed and graded sand and gravel aggregate placed around a drain or well screen to prevent the movement of fine materials from the aquifer into the drain or well.

GRAVEL TRENCH - A shallow excavated channel backfilled with gravel and designed to provide temporary storage and permit percolation of runoff into the soil substrate.

Green Alleys - A network of bioretention basins, infiltration trenches or bioretention filters that provide both redundant water quality management and stormwater conveyance.

green roof a rooftop treatment practice where a thin planting media is established on roof surfaces and then planted with hardy, low-growing vegetation

greenway - A strip or belt of vegetated land that typically includes both upland and riparian areas. Greenways are often used for recreation, as a land use buffer, or to provide a corridor and habitat for wildlife.

GROUND COVER - Plants that are low growing and provide a thick growth that protects the soil as well as providing some beautification of the area occupied.

ground water water occupying the sub-surface saturated zone

Ground Water - The supply of fresh water found beneath the earth's surface (usually in aquifers) that provides base flow to streams and rivers and is often used for supplying wells and springs. The inflow to a ground water reservoir is called ground water recharge.

ground water mounding the localized rise in water table or potentiometric surface caused by the addition or injection of water

GULLY - A channel or miniature valley cut by concentrated runoff through which water commonly flows only during and immediately after heavy rains or during the melting of snow. The distinction between gully and rill is one of depth. A gully is sufficiently deep that it would not be obliterated by normal tillage operations, whereas a rill is of lesser depth and would be smoothed by ordinary farm tillage.

gully erosion the widening, deepening and head cutting of small channels and waterways (rills) due to erosion by water or snowmelt, typified by channels one foot or more deep

Gutter – The edge of a street (below the curb) designed to drain water runoff from streets, driveways, parking lots, etc. into catch basins and storm drains.

H

habitat – The environment occupied by individuals of a particular species, population, or community.

Hazardous substance - Any substance designated under the Code of Virginia and 40 CFR Part 116 (2000) pursuant to §311 of the CWA.

Head - The height of water above any plane or object of reference; also used to express the energy, either kinetic or potential, measured in feet, possessed by each unit weight of a liquid.

headwall – A wall of stone, metal, concrete, or wood at the end of a culvert or drain to protect fill from scour or undermining, increase hydraulic efficiency of conduit, divert flow, retard disjuncting of short sectional pipe, or serve as a retaining wall.

heavy metals – Metallic elements having atomic weights above 21 on the periodic table.

HEC-1 - Hydraulic Engineering Circular - 1; a rainfall-runoff event simulation computer model sponsored by the U.S. Corps of Engineers.

HEC-2 a rainfall-runoff model developed by the U.S. Army Corps of Engineers to compute steady-state water surface elevation profiles in natural and constructed channels.

HEMIC PEAT - An organic material, usually derived from wetland vegetation that is moderately decomposed, has a moderate bulk density and modest porosity.

herbaceous – Plant parts that contain chlorophyll and are non-woody.

HERBACEOUS PERENNIAL (PLANTS) - A plant whose stems die back to the ground each year.

high density residential a high concentration of housing units in a specific area or on a specific property, typical of urban areas

HIGH MARSH - A pondscaping zone within a stormwater wetland that exists from the surface of the normal pool to a six-inch depth and typically contains the greatest density and diversity of emergent wetland plants.

HIGH MARSH WEDGES - Slices of shallow wetland (less than or equal to 6 inches) dividing a stormwater wetland.

hotspot point source potential pollution generating land uses such as gas stations, chemical storage facilities, industrial facilities, etc

Hybrid design – A design that employs both LID and conventional BMPs or detention practices to meet stormwater requirements. Such a design might include LID practices or strategies such as the conservation of specific natural features and open space to the greatest extent possible, while detention measures or centralized BMPs are also implemented to provide peak rate or quantity control beyond the site-specific capabilities of the LID strategy. Another example of a hybrid design is one that incorporates LID for both the attenuation and infiltration of small storm events, and centralized BMPs to provide storage for larger storm events.

hydraulic conductivity (K) – An expression of the readiness with which a liquid such as water flows through a soil in response to a given potential gradient. Hydraulic conductivity is a constant physical property of soil or rock, one of several components responsible for the dynamic phenomenon of flow.

HYDRAULIC GRADIENT - The slope of the hydraulic grade line. The slope of the free surface of water flowing in an open channel.

hydraulic loading rate (HLR) – Ratio of the surface area of a hydraulic device and the average rate at which water is delivered to the A measure of the application of a volume of water to a land area with units of volume per area per time or simply reduced to applied device water depth per time (for example, $m^3/(m^2/d)$ or cm/d).

hydraulic residence time (HRT) – A measure of the average time that water occupies a given volume with units of time. The theoretical HRT is calculated as the volume divided by the flow [for example, $m^3/(m^2/d)$]. The actual HRT is estimated on the basis of tracer studies that used conservative tracers such as lithium or dyes.

Hydraulics - The physical science and technology of the static and dynamic behavior of fluids.

Hydric soil - A soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part.

hydroperiod – The period of wetland soil saturation or flooding. Hydroperiod is often expressed as a number of days or a percentage of time flooded during an annual period (for example, 25 days or 7 percent).

Hydrodynamic structure - An engineered flow through structure which uses gravitational settling to separate sediments and oils from stormwater runoff.

Hydrograph - A plot showing the rate of discharge, depth or velocity of flow versus time for a given point on a stream or drainage system.

Hydrologic cycle - A continuous process by which water is cycled from the oceans to the atmosphere to the land and back to the oceans.

Hydrologic Soil Group (HSG) - SCS classification system of soils based on the permeability and infiltration rates of the soils. 'A' type soils are primarily sandy in nature with a high permeability while 'D' type soils are primarily clayey in nature with a low permeability.

Hydrologic Unit Code (HUC) - A watershed unit established in the most recent version of Virginia's 6th Order National Watershed Boundary Dataset.

Hydrology - Science dealing with the distribution and movement of water.

HYDROSEED - Seed or other material applied to areas in order to revegetate after a disturbance.

Hyetograph - A graph of the time distribution of rainfall over a watershed.

HYPOXIA - Lack of oxygen in a waterbody resulting from eutrophication.

I

Illicit discharge - Any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except discharges pursuant to a VPDES or VSMP permit (other than the VSMP permit for discharges from the municipal separate storm sewer), discharges resulting from fire fighting activities, and discharges identified by and in compliance with 4VAC50-60-1220 C 2.

impaired waters streams or lakes that do not meet their designated uses because of excess pollutants or identified stressors

Impervious cover - A surface composed of any material that significantly impedes or prevents natural infiltration of water into soil. Impervious surfaces include, but are not limited to, conventional roofs, buildings, streets, parking areas, and any conventional concrete, asphalt, or gravel surface that is or may become compacted.

impervious surface a surface in the landscape that impedes the infiltration of rainfall and results in an increased volume of surface runoff

Impervious Surface – A surface that cannot be penetrated by water such as pavement or rock and prevents infiltration, thus generating runoff.

Impoundment - An artificial collection or storage of water, as a reservoir, pit, dugout, sump, etc.

Incorporated place - A city, town, township, or village that is incorporated under the Code of Virginia.

Indian country - (i) All land within the limits of any Indian reservation under the jurisdiction of the United States government, notwithstanding the issuance of any patent, and including rights-of-way running through the reservation; (ii) all dependent Indian communities with the borders of the United States whether within the originally or subsequently acquired territory thereof, and whether within or without the limits of a state; and (iii) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.

Indirect discharger - A nondomestic discharger introducing "pollutants" to a "publicly owned treatment works (POTW)."

Deleted: Impervious cover - A surface composed of any material that significantly impedes or prevents natural infiltration of water into soil. Impervious surfaces include, but are not limited to, roofs, buildings, streets, parking areas, and any concrete, asphalt, or compacted gravel surface.¶

Indirect Effects – Those where the hydrologic or hydraulic response may not be quantifiable by established analytical methods, yet they have inherent effects on the hydrologic and hydraulic response of the site to the post-development condition, including water quality. For example, the preservation and/or enhancement of the natural stream buffer, or the strategic location of utility corridors may preserve and protect certain hydrologic components of the pre-developed site, without the benefit of being quantified in the hydrologic analysis.

individual permit necessary if activities are not covered under one of the state's general permit provisions

industrial materials or activities include but are not limited to material handling equipment or activities, industrial machinery, raw materials, intermediate products, by-products, final products, or waste products

INDUSTRIAL MULTI-SECTOR STORMWATER PERMIT - An individual or general NPDES permit issued to a commercial industry or group of industries that regulates the pollutant levels associated with industrial storm water discharges or specifies on-site pollution control strategies.

Industrial Stormwater Permit - NPDES permit issued to a commercial industry for regulating the pollutant levels associated with industrial stormwater discharges. The permit may specify on-site pollution control strategies.

INFILL DEVELOPMENT - An "infill development site" shall be defined as meeting all of the following:

1. The site is currently predominately pervious.
2. The site is surrounded (on at least three sides) by existing development.
3. The site is served by a network of existing infrastructure and does not require the extension of utility lines or new public road construction to serve the property (a "utility extension" is defined as construction of a main-line water, sewer, gas, or other utility, and does not include individual service connections for the subject project).
4. The site is: ten (10) acres or less, if residential (including single family and multifamily); and five (5) acres or less, if commercial, industrial or multi-use.

infiltration flow of water from the land surface into the subsurface

infiltration – The entrance of surface water into the soil, usually at the soil/air interface.

Infiltration facility - A stormwater management facility which temporarily impounds runoff and discharges it via infiltration through the surrounding soil. While an infiltration facility may also be equipped with an outlet structure to discharge impounded runoff, such discharge is normally reserved for overflow and other emergency conditions. Since an infiltration facility impounds runoff only temporarily, it is normally dry during nonrainfall periods. Infiltration basin, infiltration trench, infiltration dry well, and porous pavement are considered infiltration facilities.

INFILTRATION RATE (f_c) - The rate at which stormwater percolates into the subsoil measured in inches per hour.

infiltration testing – Specific tests designed to measure the saturated movement of water into the soil in a single direction downward through a two dimensional soil surface without producing runoff. Also called initial losses.

INFLOW PROTECTION - A water-handling device used to protect the transition area between any water conveyance (dike, swale, or swale dike) and a sediment-trapping device.

Initial abstraction - The maximum amount of rainfall that can be absorbed under specific conditions

inlet protection preservation of the integrity and protection from the erosion of the area where water enters into a treatment area usually by vegetation or armoring

Inspection - An on-site review of the project's compliance with the permit, the local stormwater management program, and any applicable design criteria, or an on-site review to obtain information or conduct surveys or investigations necessary in the enforcement of the Act and this chapter.

Integrated Management Practices (IMPs) – Small-scale structural stormwater practices distributed throughout a site or drainage area for the purpose of managing or influencing the site hydrology

Intensity - The depth of rainfall divided by duration.

intensity–duration–frequency curves (IDF) graphical representation of the intensity, duration, and frequency of a differing rainfalls over time

intensive green roof rooftop systems including earth-bermed structures which are reliant on rich, deep substrates and may include shrubs or trees

interflow water that travels laterally or horizontally through the aeration zone during or immediately after a precipitation event and discharges into a stream or other body of water

Interstate agency - An agency of two or more states established by or under an agreement or compact approved by Congress, or any other agency of two or more states having substantial powers or duties pertaining to the control of pollution as determined and approved by the administrator under the CWA and regulations.

interstitial water water in the pore spaces of soil or rock

Invert - The lowest flow line elevation in any component of a conveyance system, including storm sewers, channels, weirs, etc.

isopluvial line on a map along which an equal percentage of the total annual precipitation falls in a given season or month

Issue Paper one in a series of nine decision papers on key topics developed by CWP and EOR during production of the manual

J

K

karst a type of topography that results from dissolution and collapse of carbonate rocks such as limestone characterized by closed depressions, sinkholes, caves, and underground drainage

Karst – A region made up of porous limestone containing deep fissures and sinkholes characterized by underground caves and streams.

Karst features - Sinkholes, sinking and losing streams, caves, large flow springs, and other such landscape features found in karst areas.

Karst topography - Regions that are characterized by formations underlain by carbonate rock and typified by the presence of limestone caverns and sinkholes.

Kjeldahl Nitrogen (TKN) - A measure of the ammonia and organic nitrogen present in a water sample.

L

lacustrine – The deep-water zone of a lake or reservoir.

Lag time - The interval between the center of mass of the storm precipitation and the peak flow of the resultant runoff.

Land development - A manmade change to, or construction on, the land surface that changes its runoff characteristics. Certain types of land development are exempted from stormwater management requirements as provided in the Stormwater Management Act, § 10.1-603.8 B of the Code of Virginia.

Land disturbance or land-disturbing activity - A manmade change to the land surface that potentially changes its runoff characteristics including any clearing, grading, or excavation associated with a construction activity regulated pursuant to the CWA, the Act, and this chapter.

Land use - Any type of human modification of the natural environment (NRC 2008).

Landscaping - The placement of vegetation in and around stormwater management BMP's.

Large construction activity - Construction activity including clearing, grading and excavation, except operations that result in the disturbance of less than five acres of total land area. Large construction activity also includes the disturbance of less than five acres of total land area that is a part of a larger common plan of development or sale if the larger common plan will ultimately disturb five acres or more.

Large municipal separate storm sewer system - All municipal separate storm sewers that are either:

- 1) Located in an incorporated place with a population of 250,000 or more as determined by the 1990 decennial census by the Bureau of Census (40 CFR Part 122 Appendix F (2000));
- 2) Located in the counties listed in 40 CFR Part 122 Appendix H (2000), except municipal separate storm sewers that are located in the incorporated places, townships or towns within such counties;
- 3) Owned or operated by a municipality other than those described in subdivision 1 or 2 of this definition and that are designated by the board as part of the large or medium municipal separate storm sewer system due to the interrelationship between the discharges of the designated storm sewer and the discharges from municipal separate storm sewers described under subdivision 1 or 2 of this definition. In making this determination the board may consider the following factors:
 - a. Physical interconnections between the municipal separate storm sewers;
 - b. The location of discharges from the designated municipal separate storm sewer relative to discharges from municipal separate storm sewers described in subdivision 1 of this definition;
 - c. The quantity and nature of pollutants discharged to surface waters;
 - d. The nature of the receiving waters; and
 - e. Other relevant factors.
- 4) The board may, upon petition, designate as a large municipal separate storm sewer system, municipal separate storm sewers located within the boundaries of a region defined by a stormwater management regional authority based on a jurisdictional, watershed, or other appropriate basis that includes one or more of the systems described in this definition.

large storm hydrology a 10-year or greater storm event

lattice blocks a form of pervious pavers consisting of interlocking components having an open space in the middle for vegetation or gravel

LEVEL SPREADER - A device for distributing stormwater uniformly over the ground surface as sheet flow to prevent concentrated, erosive flows and promote infiltration.

Level Spreader – An outlet designed to convert concentrated runoff to sheet flow and disperse it uniformly across a slope to prevent erosion.

limnetic – Relating to or inhabiting the open water part of a freshwater body with a depth that light penetrates. The area of a wetland without emergent vegetation.

Linear development project - A land-disturbing activity that is linear in nature such as, but not limited to, (i) the construction of electric and telephone utility lines, and natural gas pipelines; (ii) construction of tracks, rights-of-way, bridges, communication facilities and other related structures of a railroad company; and (iii) highway construction projects.

littoral zone – The shoreward zone of a lake or wetland. The area where water is shallow enough for emergent vegetation to dominate.

live storage the portion of a storage basin or reservoir that is at or above the outlet and used for temporary water storage

Local stormwater management program or local program - The various methods employed by a locality or the department to manage the quality and quantity of runoff resulting from land-disturbing activities and shall include such items as local ordinances, permit requirements, policies and guidelines, technical materials, plan review, inspection, enforcement, and evaluation consistent with the Act and this chapter

Locality - A county, city, or town.

low density residential a low concentration of housing units in a specific area or on a specific property, typical of rural areas

Low Impact Development (LID) - Hydrologically functional site design with pollution prevention measures to reduce impacts and compensate for development impacts on hydrology and water quality.

M

macrophyte – Macroscopic (visible to the unassisted eye) vascular plants.

Major facility - Any VSMP facility or activity classified as such by the regional administrator in conjunction with the board.

Major modification - For the purposes of this chapter, the modification or amendment of an existing permit before its expiration that is not a minor modification as defined in this regulation.

Major municipal separate storm sewer outfall (major outfall) - A municipal separate storm sewer outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (discharge

Deleted: Linear development project - A land development project that is linear in nature such as , but not limited to, (I) the construction of electric and telephone utility lines, and natural gas pipelines; (ii) construction of tracks, rights-of-way, bridges, communication facilities and other related structures of a railroad company; and (iii) highway construction projects.

from a single conveyance other than circular pipe which is associated with a drainage area of more than 50 acres); or for municipal separate storm sewers that receive stormwater from lands zoned for industrial activity (based on comprehensive zoning plans or the equivalent), with an outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (discharge from other than a circular pipe associated with a drainage area of two acres or more).

Man-made - Constructed by man

Man-made stormwater conveyance system - A pipe, ditch, vegetated swale, or other conveyance constructed by man.

Manning's formula - Equation used to predict the velocity of water flow in an open channel or pipeline.

MANNING'S FORMULA (HYDRAULICS) - A formula used to predict the velocity of water flow in an open channel or pipeline:

$$V = (1.486/n) R^{2/3} S^{1/2}$$

Where V is the mean velocity of flow in feet per second; R is the hydraulic radius; S is the slope of the energy gradient or for assumed uniform flow the slope of the channel, in feet per foot; and n is the roughness coefficient or retardance factor of the channel lining.

Marsh - A wet area, periodically inundated with standing or slow moving water, that has grassy or herbaceous vegetation and often little peat accumulation; the water may be salt, brackish or fresh.

Maximum daily discharge limitation - The highest allowable daily discharge.

Maximum extent practicable (MEP) - The technology-based discharge standard for municipal separate storm sewer systems established by CWA §402(p). MEP is achieved, in part, by selecting and implementing effective structural and nonstructural best management practices (BMPs) and rejecting ineffective BMPs and replacing them with effective best management practices (BMPs). MEP is an iterative standard, which evolves over time as urban runoff management knowledge increases. As such, the operator's MS4 program must continually be assessed and modified to incorporate improved programs, control measures, BMPs, etc., to attain compliance with water quality standards.

media filters filtration of stormwater through a variety of different filtering materials whose purpose is to remove pollution from runoff

medium density residential a moderate concentration of housing units in a specific area or on a specific property, typical of suburban areas

Medium municipal separate storm sewer system - All municipal separate storm sewers that are either:

1. Located in an incorporated place with a population of 100,000 or more but less than 250,000 as determined by the 1990 decennial census by the Bureau of Census (40 CFR Part 122 Appendix G (2000));
2. Located in the counties listed in 40 CFR Part 122 Appendix I (2000), except municipal separate storm sewers that are located in the incorporated places, townships or towns within such counties;
3. Owned or operated by a municipality other than those described in subdivision 1 or 2 of this definition and that are designated by the board as part of the large or medium municipal separate storm sewer system due to the interrelationship between the discharges of the designated storm sewer and the discharges from municipal separate storm sewers described under subdivision 1 or 2 of this definition. In making this determination the board may consider the following factors:
 - a. Physical interconnections between the municipal separate storm sewers;

b. The location of discharges from the designated municipal separate storm sewer relative to discharges from municipal separate storm sewers described in subdivision 1 of this definition;

c. The quantity and nature of pollutants discharged to surface waters;

d. The nature of the receiving waters; or

e. Other relevant factors.

4. The board may, upon petition, designate as a medium municipal separate storm sewer system, municipal separate storm sewers located within the boundaries of a region defined by a stormwater management regional authority based on a jurisdictional, watershed, or other appropriate basis that includes one or more of the systems described in subdivisions 1, 2 and 3 of this definition.

mesotrophic waters containing an intermediate level of nutrients and biological production

micronutrient – A chemical substance that is required for biological growth in relatively low quantities and in small proportion to the major growth nutrients. Some typical micronutrients include molybdenum, copper, boron, cobalt, iron, and iodine.

Micropool - A smaller permanent pool which is incorporated into the design of larger stormwater ponds to avoid resuspension of particles, provide varying depth zones, and minimize impacts to adjacent natural features.

MICROTOPOGRAPHY - The complex contours along the bottom of a shallow marsh system, providing greater depth variation, which increases the wetland plant diversity and increases the surface area to volume ratio of a stormwater wetland.

minimum control measures six required components of SWPPPs for MS4 communities. The six minimum control measures are: public education/outreach; public participation/ involvement; illicit discharge detection and elimination; construction site runoff control; post-construction site runoff control; and pollution prevention/ good housekeeping.

Minor modification - For the purposes of this chapter, minor modification or amendment of an existing permit before its expiration as specified in 4VAC50-60-640. Minor modification for the purposes of this chapter also means other modifications and amendments not requiring extensive review and evaluation including, but not limited to, changes in EPA promulgated test protocols, increasing monitoring frequency requirements, changes in sampling locations, and changes to compliance dates within the overall compliance schedules. A minor permit modification or amendment does not substantially alter permit conditions, substantially increase or decrease the amount of surface water impacts, increase the size of the operation, or reduce the capacity of the facility to protect human health or the environment.

mitigation – The replacement of functional values lost when an ecosystem is altered. Mitigation can include replacement, restoration, and enhancement of functional values.

mobilization the release and movement of bound chemicals, nutrients, or pollutants into the environment

Modified Rational Method - A variation of the rational method used to calculate the critical storage volume whereby the storm duration can vary and does not necessarily equal the time of concentration.

mottled soil marked with irregular brown and gray/black colors indicative of poor drainage and routine saturation cycles

Mulch - Any material such as straw, sawdust, leaves, plastic film, loose soil, wood chips, etc. that is spread or formed upon the surface of the soil to protect the soil and/or plant roots from the effects of raindrops,

soil crusting, freezing, evaporation, etc.

Municipal separate storm sewer - A conveyance or system of conveyances otherwise known as a municipal separate storm sewer system, including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains:

1. Owned or operated by a federal, state, city, town, county, district, association, or other public body, created by or pursuant to state law, having jurisdiction or delegated authority for erosion and sediment control and stormwater management, or a designated and approved management agency under §208 of the CWA that discharges to surface waters;
2. Designed or used for collecting or conveying stormwater;
3. That is not a combined sewer; and
4. That is not part of a publicly owned treatment works.

Municipal separate storm sewer system (MS4) - All separate storm sewers that are defined as "large" or "medium" or "small" municipal separate storm sewer systems or designated under 4VAC50-60-380 A 1.

Municipal Separate Storm Sewer System Management Program (MS4 Program) - A management program covering the duration of a permit for a municipal separate storm sewer system that includes a comprehensive planning process that involves public participation and intergovernmental coordination, to reduce the discharge of pollutants to the maximum extent practicable, to protect water quality, and to satisfy the appropriate water quality requirements of the CWA and regulations and the Act and attendant regulations, using management practices, control techniques, and system, design and engineering methods, and such other provisions that are appropriate.

Municipal Stormwater Permit - NPDES permit issued to municipalities to regulate discharges from municipal separate storm sewers for compliance with EPA regulations and specify stormwater control strategies.

Municipality - A city, town, county, district, association, or other public body created by or under state law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under §208 of the CWA.

N

National Pollutant Discharge Elimination System (NPDES) - The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements under §§307, 402, 318, and 405 of the CWA. The term includes an approved program.

native vegetation plants that are adapted to and occur naturally in a specific location

natural area conservation the identification and protection of natural resources and features that maintain the pre-development hydrology at a site by reducing runoff, promoting infiltration, and preventing soil erosion.

Natural channel design concepts - The utilization of engineering analysis and fluvial geomorphic processes to create, rehabilitate, restore, or stabilize an open conveyance system for the purpose of creating or recreating a stream that conveys its bankfull storm event within its banks and allows larger flows to access its floodplain.

Natural stormwater conveyance system - The main channel of a natural stream, in combination with the floodway and flood fringe, which compose the floodplain.

Deleted: National Pollutant Discharge Elimination System (NPDES) - The national program for issuing, modifying, monitoring and enforcing permits under Sections 307, 402, 318 and 405 of the Clean Water Act. ¶

Natural stream - A tidal or nontidal watercourse that is part of the natural topography. It usually maintains a continuous or seasonal flow during the year and is characterized as being irregular in cross-section with a meandering course. Constructed channels such as drainage ditches or swales shall not be considered natural streams.

NEW DEVELOPMENT - The construction of new impervious surface on a tract or tracts of land where no impervious surface previously existed.

New discharger - Any building, structure, facility, or installation:

1. From which there is or may be a discharge of pollutants;
2. That did not commence the discharge of pollutants at a particular site prior to August 13, 1979;
3. Which is not a new source; and
4. Which has never received a finally effective VPDES or VSMP permit for discharges at that site.

This definition includes an indirect discharger that commences discharging into surface waters after August 13, 1979. It also includes any existing mobile point source (other than an offshore or coastal oil and gas exploratory drilling rig or a coastal oil and gas developmental drilling rig) such as a seafood processing rig, seafood processing vessel, or aggregate plant, that begins discharging at a site for which it does not have a permit; and any offshore or coastal mobile oil and gas exploratory drilling rig or coastal mobile oil and gas developmental drilling rig that commences the discharge of pollutants after August 13, 1979.

NEW IMPERVIOUS SURFACE – An impervious surface created after the effective date of this Rule.

New permit - For the purposes of this chapter, a permit issued by the permit-issuing authority to a permit applicant that does not currently hold and has never held a permit of that type, for that activity, at that location.

New source - Any building, structure, facility, or installation from which there is or may be a discharge of pollutants, the construction of which commenced:

1. After promulgation of standards of performance under §306 of the CWA that are applicable to such source; or
2. After proposal of standards of performance in accordance with §306 of the CWA that are applicable to such source, but only if the standards are promulgated in accordance with §306 of the CWA within 120 days of their proposal.

NEW STORMWATER DISCHARGE – A new or expanded discharge of regulated stormwater runoff, subject to the permitting requirements of 10 V.S.A. Chapter 47, which first occurs after June 1, 2002 and has not been previously authorized pursuant to 10 V.S.A. Chapter 47.

90% capture rule the design of stormwater treatment practices to capture and treat 90% of the annual rainfall from runoff producing events

nitrification – Biological transformation (oxidation) of ammonia nitrogen to nitrite and nitrate forms.

nitrogen fixation – A microbial process in which atmospheric nitrogen gas is incorporated into the synthesis of organic nitrogen.

NITROGEN-FIXING (BACTERIA) - Bacteria having the ability to fix atmospheric nitrogen, making it available for use by plants. Inoculation of legume seeds is one way to insure a source of these bacteria for specified legumes.

no exposure all industrial materials or activities are protected by a storm resistant shelter to prevent exposure to rain, snow, snowmelt, or runoff

Noncomputable pollutant a pollutant for which there is not enough runoff concentration and BMP performance data available to perform a site-based pollutant load calculation documenting no increase in loading

Nonpoint Education for Municipal Officials (NEMO) a University of Connecticut educational program for land use decision makers that addresses the relationship of land use to natural resource protection

Nonpoint source pollution - Pollution such as sediment, nitrogen and phosphorous, hydrocarbons, heavy metals, and toxics whose sources cannot be pinpointed but rather are washed from the land surface in a diffuse manner by stormwater runoff.

Non-structural BMPs – Natural features or directed activities specifically utilized for the purpose of managing or influencing the site hydrology and/or improving water quality. Non-structural practices can include pollution prevention, preservation of open space and natural flow paths, street sweeping, etc.

Normal depth - Depth of flow in an open conduit during uniform flow for the given conditions.

Q

Off-line - Stormwater management system designed to manage a portion of the stormwater which has been diverted from a stream or storm drain. A flow splitter is typically used to divert the desired portion of the flow.

OFF-SITE - Land within a project's drainage area that is not characterized as being part of the site.

OFFSET OR OFFSET PROJECT – A state-permitted action or project within a stormwater-impaired water that a discharger or a third person may complete to mitigate the impacts that an existing or proposed discharge or discharges of regulated stormwater runoff has or is expected to have on the stormwater-impaired water.

OFFSET CHARGE – The amount of sediment load or hydrologic impact that an offset must reduce or control in the stormwater-impaired water in which the offset is located.

OFFSET CHARGE CAPACITY – The amount of reduction in sediment load or hydrologic impact that an offset project generates.

oligotrophic water bodies or habitats with low concentrations of nutrients

On-line - Stormwater management system designed to manage stormwater in its original stream or drainage channel.

Deleted: Nonpoint source pollution - Contaminants such as sediment, nitrogen and phosphorous, hydrocarbons, heavy metals, and toxins whose sources cannot be pinpointed but rather are washed from the land surface in a diffuse manner by stormwater runoff.¶

one-half inch rule based on the first flush concept stating that the majority of the pollutants in urban runoff are carried in the first one-half inch of runoff. The half-inch rule defines the water quality volume as one-half inch times the impervious area.

ONE HUNDRED-YEAR STORM (Q₁₀₀) A extreme flood event which occurs on average once every 100 years or statistically has a 1% chance on average of occurring in a given year.

ONE-YEAR STORM (Q₁) - A stormwater event which occurs on average once every year or statistically has a 100% chance on average of occurring in a given year.

OPEN CHANNELS - Also known as swales, grass channels, and biofilters. These systems are used for the conveyance, retention, infiltration and filtration of stormwater runoff.

open graded material – Uniform granular mixture with a narrow distribution of grain sizes. Open graded material has higher permeability than dense graded material.

Operator - The owner or operator of any facility or activity subject to regulation under the VSMP program. In the context of stormwater associated with a large or small construction activity, operator means any person associated with a construction project that meets either of the following two criteria: (i) the person has direct operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications or (ii) the person has day-to-day operational control of those activities at a project that are necessary to ensure compliance with a stormwater pollution prevention plan for the site or other permit conditions (i.e., they are authorized to direct workers at a site to carry out activities required by the stormwater pollution prevention plan or comply with other permit conditions). In the context of stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s), operator means the operator of the regulated MS4 system.

Deleted: ¶

organic nitrogen (Org-N) – Nitrogen that is bound in organic compounds.

orifice outlet

Outfall - When used in reference to municipal separate storm sewers, a point source at the point where a municipal separate storm sewer discharges to surface waters and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other surface waters and are used to convey surface waters.

~~**Outfall** – Place where effluent is discharged into receiving waters.~~

OUTLET - The point at which water discharges from such things as a stream, river, lake, tidal basin, pipe, channel or drainage area.

OUTLET CHANNEL - A waterway constructed or altered primarily to carry water from man-made structures such as terraces, subsurface drains, diversions and impoundments.

OUTLET CONTROL STRUCTURE - A hydraulic structure placed at the outlet of a channel, spillway, pond, etc., for the purpose of dissipating energy, providing a transition to the channel or pipe downstream, while achieving the discharge rates for specified designs.

Outstanding Resource Value Waters (ORVW) defined in Minnesota Rule 7050.0180 as waters within the

Boundary Waters Canoe Area Wilderness, Voyageur's National Park, and Department of Natural Resources designated scientific and natural areas, wild, scenic, and recreational river segments, Lake Superior, those portions of the Mississippi River from Lake Itasca to the southerly boundary of Morrison County that are included in the Mississippi Headwaters Board comprehensive plan dated February 12, 1981, and other waters of the state with high water quality, wilderness characteristics, unique scientific or ecological significance, exceptional recreational value, or other special qualities which warrant stringent protection from pollution.

over-control originally proposed by McCuen in 1979, the practice of designing a system with more controls in place than it is strictly computed to be necessary for the 2-year design storm to afford some measure of channel protection

overbank flood protection prevention of flood damage to conveyance systems and infrastructure and reduction of minor flooding caused by an increased frequency and magnitude of floods exceeding the bankful capacity of a channel and spilling out over the floodplain.

Overburden - Any material of any nature, consolidated or unconsolidated, that overlies a mineral deposit, excluding topsoil or similar naturally occurring surface materials that are not disturbed by mining operations.

Owner - The Commonwealth or any of its political subdivisions including, but not limited to, sanitation district commissions and authorities, and any public or private institution, corporation, association, firm or company organized or existing under the laws of this or any other state or country, or any officer or agency of the United States, or any person or group of persons acting individually or as a group that owns, operates, charters, rents, or otherwise exercises control over or is responsible for any actual or potential discharge of sewage, industrial wastes, or other wastes or pollutants to state waters, or any facility or operation that has the capability to alter the physical, chemical, or biological properties of state waters in contravention of §62.1-44.5 of the Code of Virginia, the Act and this chapter.

P

palustrine wetland – All nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and all such tidal wetlands in areas where salinity from ocean-derived salts is below 0.5 parts per thousand.

peak attenuation storage – The volume set aside within a BMP for the purpose of attenuating the inflow runoff peak rate.

Peak discharge - The maximum rate of flow at associated with a given rainfall event or channel.

peak flow control controlling the timing and magnitude of the largest flow either leaving the site or flowing through the watershed utilizing stormwater management techniques to avoid flooding and damage downstream.

Peak flow rate - The maximum instantaneous flow from a prescribed design storm at a particular location.

Percent impervious - The impervious area within the site divided by the area of the site multiplied by 100.

percolation – The downward movement under the influence of gravity of water under hydrostatic pressure through the interstices of the rock or soil.

Percolation rate - The velocity at which water moves through saturated, granular material.

perennial – Persisting for more than one year. Perennial plant species persist as woody vegetation from year to year or re-sprout from their rootstock annually.

perimeter control activities or practices designed to contain sediments on a project site

periphyton – The community of microscopic plants and animals that grows on the surface of emergent and submergent plants in water bodies.

PERMANENT SEEDING - Results in establishing perennial vegetation that may remain on the area for many years.

permanent storage pool the volume in a pond or reservoir below the lowest outlet level, designed for water quality purposes to settle out particles and nutrients

permeability – The ability of rock, soil or other material to transmit a gas or liquid.

Permeability – The property of a soil to transmit water under a gradient. It is measured by the quantity of water passing through a unit cross section, in a unit time, under a hydraulic gradient.

permeable paver a range of products that enable some fraction of rainfall to be infiltrated into a sub-base underneath the paver

PERMISSIBLE VELOCITY (HYDRAULICS) - The highest average velocity at which water may be carried safely in a channel or other conduit. The highest velocity that can exist through a substantial length of a conduit and not cause scour of the channel. A safe, non-eroding or allowable velocity.

Permit - An approval issued by the permit-issuing authority for the initiation of a land-disturbing activity or for stormwater discharges from an MS4. Permit does not include any permit that has not yet been the subject of final permit-issuing authority action, such as a draft permit or a proposed permit.

Permit-issuing authority - The board, the department, or a locality with a qualifying local program.

Permittee - The person or locality to which the permit is issued, including any operator whose construction site is covered under a construction general permit.

permittivity (cross-plane flow capacity) – Rate that water will flow freely through a thin layer, such as a geotextile. Equal to the hydraulic conductivity divided by the thickness of the layer. Permittivity is measured in units of inverse time (e.g., sec⁻¹).

Person - Any individual, corporation, partnership, association, state, municipality, commission, or political subdivision of a state, governmental body (including but not limited to a federal, state, or local entity), any interstate body or any other legal entity.

pH - An expression of the intensity of the basic or acidic condition of a liquid. Natural waters usually have a pH range between 6.5 and 8.5.

Phase II A 1987 amendment to the federal Clean Water Act required implementation of a two-phase comprehensive national program to address stormwater runoff. Phase I regulated large

construction sites, 10 categories of industrial facilities, and major metropolitan MS4s. On March 10, 2003 the program broadened to include smaller construction sites, municipally owned or operated industrial activity, and many more municipalities

Phosphorus - An element found in fertilizers and sediment runoff which can contribute to the eutrophication of water bodies. It is the keystone pollutant in determining pollutant removal efficiencies for various BMP's as defined by the Virginia Stormwater Management Regulations.

photic zone – The area of a water body receiving sunlight.

piezometric surface – The surface defined by elevation to which groundwater will rise in a well.

PIPING - Removal of soil material through subsurface flow channels or "pipes" developed by seepage water.

Pitt Method means of calculating the treatment depth of rainfall based on Dr. Robert Pitt's work on rainfall and pollutant distribution as part of the 1983 NURP program

Planning area - A designated portion of the parcel on which the land development project is located. Planning areas shall be established by delineation on a master plan. Once established, planning areas shall be applied consistently for all future projects.

plug flow – Linear flow along the length of a wetland cell. Ideal plug flow does not involve the dispersion or diffusion of constituents. The flow can be perceived as a series of independent "packets" of water that do not interact with each other.

Deleted: Planning area - A designated portion of the parcel on which a land development project is located. Planning areas must be established by delineation on a master plan. Once established, planning areas must be applied consistently for all future projects.

PLUGS - Pieces of turf or sod, usually cut with a round tube, which can be used to propagate the turf or sod by vegetative means.

plunge pool – A small permanent pool at either the inlet to a BMP or at the outfall from a BMP. The primary purpose of the pool is to dissipate the velocity of stormwater runoff.

POCKET POND - A stormwater pond designed for treatment of small drainage area (< 5 acres) runoff and which has little or no baseflow available to maintain water elevations and relies on ground water to maintain a permanent pool.

POCKET WETLAND - A stormwater wetland design adapted for the treatment of runoff from small drainage areas (< 5 acres) and which has little or no baseflow available to maintain water elevations and relies on ground water to maintain a permanent pool.

Point of discharge - A location at which stormwater runoff is released.

Point source - Any discernible, confined, and discrete conveyance including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

Deleted: Point Source - The discernible, confined and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, container, concentrated animal feeding operation, landfill leachate collection system from which pollutants may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Pollutant - Dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 USC §2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean:

1. Sewage from vessels; or
2. Water, gas, or other material that is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well if the well used either to facilitate production or for disposal purposes is approved by the board and if the board determines that the injection or disposal will not result in the degradation of ground or surface water resources.

Pollutant discharge - The average amount of a particular pollutant measured in pounds per year or other standard reportable unit as appropriate, delivered in a diffuse manner by stormwater runoff.

Pollutant Load – A calculated quantity that is the result of a flow rate and pollutant concentration applied over a given amount of time.

Pollutant Removal (PR) is defined as the change in EMC as runoff flows into and out of a BMP. Pollutant removal is accomplished via processes such as settling, filtering, adsorption, and biological uptake. This does not account for changes in the overall volume of runoff entering and leaving the BMP.

pollutant removal – Removing pollutants by decomposing them or eliminating them from an area or system (e.g., volatilize), or rendering non-harmful or unavailable in a soil or medium by means of adsorption, chelation, and similar binding mechanisms.

Pollution - Such alteration of the physical, chemical or biological properties of any state waters as will or is likely to create a nuisance or render such waters (a) harmful or detrimental or injurious to the public health, safety or welfare, or to the health of animals, fish or aquatic life; (b) unsuitable with reasonable treatment for use as present or possible future sources of public water supply; or (c) unsuitable for recreational, commercial, industrial, agricultural, or other reasonable uses, provided that (i) an alteration of the physical, chemical, or biological property of state waters, or a discharge or deposit of sewage, industrial wastes or other wastes to state waters by any owner which by itself is not sufficient to cause pollution, but which, in combination with such alteration of or discharge or deposit to state waters by other owners, is sufficient to cause pollution; (ii) the discharge of untreated sewage by any owner into state waters; and (iii) contributing to the contravention of standards of water quality duly established by the State Water Control Board, are "pollution" for the terms and purposes of this chapter.

pollution load the product of flow volume times pollutant concentration

pollution prevention practices pro-active activities and strategies instituted to avoid introducing pollution into the environment

pollutograph graphical representation of pollution at a point in a drainage as a function of time

polycyclic aromatic hydrocarbon (PAH) organic compound resulting from combustion of petrochemical fuel

POND BUFFER - The area immediately surrounding a pond that acts as filter to remove pollutants and provide infiltration of stormwater prior to reaching the pond. Provides a separation barrier to adjacent development.

POND DRAIN - A pipe or other structure used to drain a permanent pool within a specified time period.

PONDNET an empirical model developed by William W. Walker in 1987 to evaluate flow and phosphorus routing in pond networks

PONDSCAPING - Landscaping around stormwater ponds that emphasizes native vegetative species to meet specific design intentions. Species are selected for up to six zones in the pond and its surrounding buffer, based on their ability to tolerate inundation and/ or soil saturation.

pore space – Open space in rock or granular material; also known as interstices.

Porosity - The ratio of pore or open space volume to total solids volume.

Post-development - Refers to conditions that reasonably may be expected or anticipated to exist after completion of the land development activity on a specific site or tract of land.

Pre-development - Refers to the conditions that exist at the time that plans for the land development of a tract of land are submitted to the plan approval authority. Where phased development or plan approval occurs (preliminary grading, roads and utilities, etc.), the existing conditions at the time prior to the first item being submitted shall establish pre-development conditions.

Deleted: ¶
Post-development - Refers to conditions that reasonably may be expected or anticipated to exist after completion of the land development activity on a specific site or tract of land.¶

precipitation – A deposit on the earth of hail, mist, sleet, rain or snow.

Pretreatment - The techniques employed in a stormwater management plan to provide storage or filtering to help trap coarse materials before they enter the stormwater BMP. Pretreatment is required on some BMPs to help avoid costly maintenance.

Deleted: Pre-development - Refers to the conditions that exist at the time that plans for the land development of a tract of land are approved by the plan approval authority. Where phased development or plan approval occurs (preliminary grading, roads and utilities, etc.), the existing conditions at the time prior to the first item being approved or permitted establishes the pre-development conditions.¶

primary treatment the first stage of wastewater treatment, including removal of floating debris and solids by screening, skimming and sedimentation

Deleted: ¶

Principal spillway - The primary spillway or conduit for the discharge of water from an impoundment facility; generally constructed of permanent material and designed to regulate the rate of discharge.

Prior developed lands - Land that has been previously utilized for residential, commercial, industrial, institutional, recreation, transportation or utility facilities or structures, and that will have the impervious areas associated with those uses altered during a land disturbing activity.

Privately owned treatment works (PVOTW) - Any device or system that is (i) used to treat wastes from any facility whose operator is not the operator of the treatment works and (ii) not a POTW.

Program for Predicting Polluting Particle Passage through Pits, Puddles and Ponds (P-8)

a physically-based model developed by William W. Walker to predict the generation and transport of stormwater runoff pollutants in urban watersheds.

PROJECT – New development, expansion, redevelopment and or existing impervious surface that the Secretary is considering for coverage under an individual or general permit or which has received coverage under an individual or general permit.

***Proposed permit** - A VSMP permit prepared after the close of the public comment period (and, when applicable, any public hearing and administrative appeals) that is sent to EPA for review before final issuance. A proposed permit is not a draft permit.*

proprietary devices stormwater treatment devices which are privately developed and owned

protozoa – Small, one-celled animals including amoebae, ciliates, and flagellates.

***Publicly owned treatment works (POTW)** - A treatment works as defined by §212 of the CWA that is owned by a state or municipality (as defined by §502(4) of the CWA). This definition includes any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes, and other conveyances only if they convey wastewater to a POTW treatment plant. The term also means the municipality as defined in §502(4) of the CWA, that has jurisdiction over the indirect discharges to and the discharges from such a treatment works.*

Q

***Qualifying local stormwater management program or qualifying local program** - A local program that is administered by a locality that has been authorized by the board to issue coverage under the VSMP General Permit for Discharges of Stormwater from Construction Activities (4 VAC 50-60-1170).*

quiescent periods periods of rest or inactivity

R

rain barrel a container used to collect and store rainwater that is usually placed below the downspout of a roof gutter. The collected water is used to water the landscape

Rain Barrels – Barrels designed to collect and store rooftop runoff.

rain garden a landscaping feature that is planted with native perennial plants and is used to manage stormwater runoff from impervious surfaces such as roofs, sidewalks, and parking lots

rainfall distribution describes how the rain fell in a 24-hour period, ie. whether the precipitation occurred over a 1-hour period or over the entire 24-hour period

rainfall frequency spectrum describes the average frequency of the depth of precipitation events (adjusted for snowfall) that occur during a normal year

rate control controlling the rate that stormwater is released from localized holding areas into larger conveyance systems

***Rational method** - Means of computing peak storm drainage flow rates based on average percent imperviousness of the site, mean rainfall intensity, and drainage area.*

receiving water a body of water such as a stream, river, lake, or ocean, which receives stormwater and wastewater

Receiving Waters – A river, ocean, stream, or other watercourse into which runoff from precipitation is discharged.

recessional limb the portion of the hydrograph after the peak where flows are returning to lower or baseflow levels

Recharge - Replenishment of groundwater reservoirs by infiltration and transmission of water through permeable soils.

RECHARGE RATE - Annual amount of rainfall that contributes to groundwater as a function of hydrologic soil group.

Recommencing discharger - A source that recommences discharge after terminating operations.

recurrence interval the inverse probability that a certain flow will occur. It represents a mean time interval based on the distribution of flows over a period of record

Redevelopment - Any construction, alteration, or improvement on existing development.

Regional administrator - The Regional Administrator of Region III of the Environmental Protection Agency or the authorized representative of the regional administrator.

REGULATED STORMWATER RUNOFF - precipitation, snowmelt, and the material dissolved or suspended in precipitation and snowmelt that runs off impervious surfaces and discharges into surface waters or into groundwater via infiltration.

removal rate the rate at which a pollutant is removed from the water column

Restored stormwater conveyance system - A stormwater conveyance system that has been designed and constructed using natural channel design concepts, including the main channel, floodway, and flood fringe.

Retain – To capture and hold storm water runoff following precipitation by means of a surface depression allowing the water to infiltrate into the soil, evaporate and possibly transporate thus reducing the hydrologic and pollution impacts downstream. Retention structures are commonly used for pollutant removal, water storage, and peak flow reduction.

Retention - Permanent storage of stormwater.

Retention basin - A stormwater management facility which includes a permanent impoundment, or normal pool of water, for the purpose of enhancing water quality and, therefore, is normally wet, even during nonrainfall periods. Storm runoff inflows may be temporarily stored above this permanent impoundment for the purpose of reducing flooding, or stream channel erosion.

retrofit the introduction of a new or improved stormwater management element where it either never existed or did not operate effectively

return period (storm event) – The average period of time between the occurrence of storms of equal or greater magnitude. The probability that such a storm will occur in any given year is equal to the reciprocal of the return period (e.g. there is a 50% chance that

a 2-year storm event will occur in any given year, but only a 10% chance that a 10-year storm event will occur).

return interval the inverse probability that a certain flow will occur. It represents a mean time interval based on the distribution of flows over a period of record

REVERSE-SLOPE PIPE - A pipe which draws from below a permanent pool extending in a reverse angle up to the riser and which determines the water elevation of the permanent pool.

Revoked permit - For the purposes of this chapter, an existing permit that is terminated by the board before its expiration.

rhizosphere – The chemical sphere of influence of plant roots growing in flooded soils. Depending on the overall oxygen balance (availability and consumption), the rhizosphere can be oxidized, resulting in the presence of aerobic soil properties in an otherwise anaerobic soil environment.

RIGHT-OF-WAY - Right of passage, as over another's property. A route that is lawful to use. A strip of land acquired for transport or utility construction.

rill erosion an erosion process in which numerous small channels several inches deep are formed

Rip-rap - Broken rock, cobbles or boulders placed on earth surfaces such as the face of a dam or the bank of a stream for the protection against erosive forces such as flow velocity and waves.

riparian – Pertaining to a stream or river. Also, plant communities occurring in association with any spring, lake, river, stream, or creek through which waters flow at least periodically.

riparian areas areas adjacent to a water body acting as transition zones between terrestrial and aquatic systems

riparian corridor – Narrow strip of land, centered on a stream, that includes the floodplain as well as related riparian habitats adjacent to the floodplain.

Riser - A vertical structure which extends from the bottom of an impoundment facility and houses the control devices (weirs/orifices) to achieve the desired rates of discharge for specific designs.

riverine wetlands – Wetlands associated with rivers.

roof leader a downspout or other conveyance for runoff that has been collected from roof tops routing stormwater down to the ground surface or to a sewer service

rooftop runoff storage installation of practices to capture and temporarily store rooftop runoff at confined sites and gradually release it over pervious areas for use for irrigation

Roughness coefficient - A factor in velocity and discharge formulas representing the effect of channel roughness on energy losses in flowing water. Manning's 'n' is a commonly used roughness coefficient.

Routing - A method of measuring the inflow and outflow from an impoundment structure while considering the change in storage volume over time.

Runoff or stormwater runoff - That portion of precipitation that is discharged across the land surface or through conveyances to one or more waterways.

runoff capture design storm – Benchmark rainfall event, used to develop criteria for designing the groundwater recharge function of BMPs. The runoff capture design storm is the largest rainfall event from which no appreciable runoff is expected to occur. Complete specification of the storm includes the rainfall depth in inches, return frequency and storm duration. The distribution of rainfall in Pennsylvania is a Type II rainfall distribution. See Section 5.3 of the Handbook.

Deleted: Runoff - The portion of precipitation, snow melt or irrigation water that runs off the land into surface waters.¶

runoff capture storage – The combined storage volume provided by BMPs on a site for the retention and eventual infiltration of rainfall.

runoff capture volume – The minimum volume of rainfall that should be retained and completely infiltrated onsite during every storm. It is also equal to the rainfall quantity associated with the runoff capture design storm. The runoff capture volume is conveniently stated as a rainfall volume, in inches, over the area of the site.

Runoff characteristics - Include, but are not limited to velocity, peak flow rate, volume, time of concentration, and flow duration, and their influence on channel morphology including sinuosity, channel cross-sectional area, and channel slope.

Runoff coefficient - The fraction of total rainfall that will appear at a conveyance as runoff.

runoff curve number (CN) – A parameter developed by the NRCS which is an indicator of runoff potential. Curve number is related to hydrologic soil group and land use type. The larger the runoff curve number, the greater the percentage of rainfall that will appear as runoff.

Deleted: Runoff coefficient - The fraction of total rainfall that appears as runoff. Represented as C in the rational method formula.¶

runoff management techniques, practices and strategies for dealing with runoff and minimizing its impact to the greater environment

runoff peak attenuation design storm – Benchmark rainfall event, used to develop criteria for the design of runoff peak attenuation BMPs. The design criteria generally requires that the predicted post development peak runoff rate for the selected runoff peak attenuation design storm will not exceed the peak associated with redeveloped condition. Complete specification of the storm includes rainfall depth in inches, return frequency and storm duration. The distribution of rainfall in Pennsylvania is a Type II rainfall distribution. See Section 5.3 of the Handbook.

Runoff Reduction -

Runoff Reduction (RR) is defined as the total annual runoff volume reduced through canopy interception, soil infiltration, evaporation, transpiration, rainfall harvesting, engineered infiltration, or extended filtration.

Runoff volume - The volume of water that runs off the land development project from a prescribed design storm.

runoff volume minimization reducing as much as possible the amount of water running off surfaces or leaving a site

S

Safety bench - A flat area above the permanent pool and surrounding a stormwater pond designed to provide a separation to adjacent slopes.

SAND - 1. (Agronomy) A soil particle between 0.05 and 2.0 millimeters in diameter. 2. A soil textural class. 3. (Engineering) According to the Unified Soil Classification System, a soil particle larger than the No. 200 sieve (0.074mm) and passing the No. 4 sieve (approximately 1/4 inch).

Sand filter - A contained bed of sand which acts to filter the first flush of runoff. The runoff is then collected beneath the sand bed and conveyed to an adequate discharge point or infiltrated into the in-situ soils.

saturated soil – Soil in which the pore space is completely filled with water.

Schedule of compliance - A schedule of remedial measures included in a permit, including an enforceable sequence of interim requirements (for example, actions, operations, or milestone events) leading to compliance with the Act, the CWA and regulations.

SCS - Soil Conservation Service (now called Natural Resource Conservation Service, NRCS), a branch of the U.S. Department of Agriculture.

seasonally high water table – Shallow water tables associated with periods of recent high levels of precipitation and/or low levels of evapotranspiration. Frequently determined in the spring.

secondary treatment biological and mechanical processes that remove dissolved or suspended material from wastewater

Secretary - The Secretary of the Army, acting through the Chief of Engineers.

SECRETARY - the Secretary of the Agency of Natural Resources or the Secretary's duly authorized representative.

sedge meadow wetland vegetative communities dominated by sedges (Cyperaceae) growing on saturated soils

Sediment - Material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by water or wind. Sediment piles up in reservoirs, rivers and harbors, destroying wildlife habitat and clouding water so that sunlight cannot reach aquatic plants.

sediment control basins a designed depression in the landscape utilized to settle out sediments from the water column before discharge into other drainages

Sediment Forebay - A settling basin or plunge pool constructed at the incoming discharge points of a stormwater facility.

sediment removal the removal, usually by settling or filtering, of suspended sediments from the water column

sediment yield The amount of sediment removed from a watershed over a specified period of time

Sedimentation (or settling) - A pollutant removal method to treat stormwater runoff in which gravity is utilized to remove particulate pollutants. Pollutants are removed from the stormwater as sediment settles or falls out of the water column. An example of a BMP utilizing sedimentation is a detention basin.

seed bank – The accumulation of viable plant seeds occurring in soil and available for germination under favorable environmental conditions.

SEEPAGE - 1. Water escaping through or emerging from the ground. 2. The process by which water percolates through the soil.

SEEPAGE LENGTH - In sediment basins or ponds, the length along the pipe and around the anti-seep collars that is within the seepage zone through an embankment.

setback – A distance from the edge of a water body within which intensive development is restricted. Setbacks are established by local regulation for the purpose of maintaining open space next to streams, lakes, and other water bodies. The area within setbacks is frequently used for flood control, recreation, preservation of drinking water supply, and wildlife habitat enhancement.

settling a technique to remove sediment from wastewater by slowing the water flow velocity allowing the sediments to sink to the bottom

Severe property damage - Substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

Shallow marsh - A zone within a stormwater extended detention basin that exists from the surface of the normal pool to a depth of six to 18 inches, and has a large surface area and, therefore, requires a reliable source of baseflow, groundwater supply, or a sizeable drainage area, to maintain the desired water surface elevations to support emergent vegetation.

sheet flow – Water flow with a relatively thin and uniform depth.

short-circuit – A faster, channelized water flow route that results in a lower actual hydraulic residence time than the theoretical hydraulic residence time. This may reduce the effectiveness of a BMP.

shrub-carr wetland plant community composed of tall, deciduous shrubs growing on saturated or seasonally flooded soils

SIDE SLOPES (ENGINEERING) - The slope of the sides of a channel, dam or embankment. It is customary to name the horizontal distance first, as 1.5 to 1, or frequently, 1 ½: 1, meaning a horizontal distance of 1.5 feet to 1 foot vertical.

Significant materials - Entails, but is not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under §101(14) of CERCLA (42 USC §9601(14)); any chemical the facility is required to report pursuant to §313 of Title III of SARA (42 USC §11023); fertilizers; pesticides; and waste products such as ashes, slag and sludge that have the potential to be released with stormwater discharges.

SILT - 1. (Agronomy) A soil separate consisting of particles between 0.05 and 0.002 millimeter in equivalent diameter. 2. A soil textural class. 3. (Engineering) According to the Unified Soil Classification System a fine-grained soil (more than 50 percent passing the No. 200 sieve) that has a low plasticity index in relation to the liquid limit.

silt curtain a natural or synthetic fabric suspended by floats and weighted at the bottom which is stretched across a water feature and used to trap and retain sediments on site

silt fence fence constructed of wood or steel supports and either natural (eg burlap) or synthetic fabric stretched across an area of non-concentrated flow during site development to trap and retain on-site sediment due to rainfall runoff

Siltation - The deposition of finely divided soil and rock particles upon the bottom of a waterbody.

Silviculture - A branch of forestry dealing with the development and care of forests.

Simple Method a technique for estimating storm pollutant export delivered from urban development sites

Single jurisdiction - For the purposes of this chapter, a single county or city. The term county includes incorporated towns which are part of the county.

Site - The land or water area where any facility or activity is physically located or conducted, a parcel of land being developed, or a designated area of a parcel in which the land development project is located. Areas channelward of mean low water in tidal Virginia shall not be considered part of a site.

site constraints conditions unique to the site that that serve to restrain, restrict, or prevent the implementation of proposed or desired design features

Deleted: Site - The parcel of land being developed, or a designated planning area in which a land development project is located.¶

Site Evaluation Tool (SET) - A spreadsheet-based model that assesses and compares predevelopment and post-development runoff, infiltration, and pollutant loading rates, which provides a methodology to aid in better site design and evaluation of BMP effectiveness.

Site Fingerprinting - A development approach that places land disturbing activities away from environmentally sensitive areas (wetlands, steep slopes, etc.), future open spaces, tree save areas, future restoration areas, and temporary and permanent vegetative forest buffer zones. Ground disturbance is confined to areas where structures, roads, and rights-of-ways will exist after construction is completed.

Site hydrology - The movement of water on, across, through and off the site as determined by parameters including, but not limited to, soil types, soil permeability, vegetative cover, seasonal water tables, slopes, land cover, and impervious cover.

site reforestation reforestation of existing turf or barren ground at the development site with the explicit goal of establishing a mature forest canopy or prairie condition that intercepts rainfall, and maximizes infiltration and evapotranspiration

skimmer device used to take up or remove floating matter from the water's surface

slope stabilization activities or techniques employed to maintain the integrity or stop the degradation of sloped areas

Small construction activity – 1) Construction activities including clearing, grading, and excavating that results in land disturbance of equal to or greater than one acre, or equal to or greater than 2,500 square feet in all areas of the jurisdictions designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations adopted pursuant to the Chesapeake Bay Preservation Act, and less than five acres. Small construction activity also includes the disturbance of less than one acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than one and less than five acres. Small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the facility. The board may waive the otherwise applicable requirements in a general permit for a stormwater discharge from construction activities that disturb less than five acres where stormwater controls are not needed based on a "total maximum daily load" (TMDL) approved or established by EPA that addresses the pollutant(s) of concern or, for nonimpaired waters that do not require TMDLs, an equivalent analysis that determines allocations for small construction sites for the pollutant(s) of concern or that determines that such allocations are not needed to protect water quality based on consideration of existing in-stream concentrations, expected growth in pollutant contributions from all sources, and a margin of safety. For the purpose of this subdivision, the pollutant(s) of concern include sediment or a parameter that addresses sediment (such as total suspended solids, turbidity or siltation) and any other pollutant that has been identified as a cause of impairment of any water body that will receive a discharge from the construction activity. The operator must certify to the board that the construction activity will take place, and stormwater discharges will occur, within the drainage area addressed by the TMDL or equivalent analysis. 2) Any other construction activity designated by the either the board or the EPA regional administrator, based on the potential for contribution to a violation of a water quality standard or for significant contribution of pollutants to surface waters.

Small municipal separate storm sewer system or small MS4 - All separate storm sewers that are (i) owned or operated by the United States, a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under §208 of the CWA that discharges to surface waters and (ii) not defined as "large" or "medium" municipal separate storm sewer systems or designated under 4VAC50-60-380 A 1. This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highway and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

small storm hydrology a less than 10-year event

snowmelt the sudden release of accumulated snow and ice with the advent of warm weather

snowpack a horizontally layered accumulation of snow from snowfall events which accumulates and persists through the winter and may be modified by meteorological conditions over time

soakaway pit small, excavated pits, backfilled with aggregate, used to infiltrate good quality stormwater runoff, such as uncontaminated roof runoff

soil amendment tilling and composting of new lawns and open spaces within a development site to recover soil porosity, bulk density, and reduce runoff

Soil Group – Hydrologic Soil Groups (HSG) are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four (4) groups on the basis of the intake of water (infiltration) after the soils have been wetted and have received precipitation from long duration storms. Group A soils have a high infiltration rate and usually include coarse sand and gravel. Group B soils have a moderate infiltration rate and include soils with moderately fine to coarse texture. Group C soils have a slow infiltration rate and include soils that have a moderately fine to fine texture. Group D soils have a very slow infiltration rate and include fine textured clays (Town of Huntersville, 2004).

Soil Moisture – Water diffused in the soil. Found in the upper part of the zone of aeration where water is discharged by transpiration from plants or by soil evaporation.

Soil science - Science dealing with soils as a natural resource on the surface of the earth including soil formation, classification, mapping; physical, chemical, biological, and fertility properties of soils per se; and these properties in relation to the use and management of soils.

Soil test - Chemical analysis of soil to determine the need for fertilizers or amendments for species of plant being grown.

Soil texture - Relative proportion of the physical components of any given soil. For instance, clay is defined as soil having >40% clay, <45% sand and <40% silt.

sorbent material which extracts one or more materials from the water via absorption or adsorption

Source - Any building, structure, facility, or installation from which there is or may be a discharge of pollutants.

source water protection area an identified area with restricted or modified land use practices designed to protect the public drinking water supply from the introduction of contaminants

Special Waters waters receiving special protections as defined in Minnesota Rules

SPILLWAY - An open or closed channel, or both, used to convey excess water from a reservoir. It may contain gates, either manually or automatically controlled to regulate the discharge of excess water.

spillway design flood (SDF) – Benchmark rainfall event, used to develop criteria for the design of BMPs that incorporate emergency spillways or overflows. Complete specification of the storm includes rainfall depth in inches, return frequency and storm duration. The distribution of rainfall in Pennsylvania is a Type II rainfall distribution. See Section 5.3 of the Handbook.

spring snowmelt event large amount of melting of the winter's accumulated snow over a short period of time (~2 weeks). Large flow volumes typical and may be the critical water quality design event

STABILIZATION - Providing adequate measures, vegetative and/or structural that will prevent erosion from occurring.

Stable - In the context of channels, a channel that has developed an established dimension, pattern and profile such that over time, these features are maintained.

Stage - Water surface elevation above any chosen datum.

stage-area curve – A line graph showing the relationship between the depth of water and the surface area of a pond, wetland, or lake.

stage-discharge curve – a line graph showing the relationship between water depth and outflow from a body of water.

STAND-ALONE OFFSET PROJECT – An offset project that is implemented by a person independent of the permitting of a discharge of regulated stormwater runoff.

STAND-ALONE OFFSET PROJECT NPDES PERMIT – A NPDES permit issued by the Secretary for a stand-alone offset project that is not completed prior to the initiation of the first discharge to which the offset charge capacity is assigned. A stand-alone offset project NPDES permit will be issued by the Secretary pursuant to the Agency's federally-authorized NPDES program under 10 V.S.A. Section 1258.

standpipe a vertical pipe or reservoir for water used to secure a uniform pressure

State - The Commonwealth of Virginia.

State/EPA agreement - An agreement between the regional administrator and the state that coordinates EPA and state activities, responsibilities and programs including those under the CWA and the Act.

State project - Any land development project that is undertaken by any state agency, board, commission, authority or any branch of state government, including state-supported institutions of higher learning.

State waters - All water, on the surface and under the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction, including wetlands.

State Water Control Law - Chapter 3.1 (§62.1-44.2 et seq.) of Title 62.1 of the Code of Virginia.

STILLING BASIN - An open structure or excavation at the foot of an outfall, conduit, chute, drop, or spillway to reduce the energy of the descending stream of water.

STORMWATER CONTROL MEASURE or SCM means a technique, measure, or structural control that is used for a given set of conditions to manage the quantity and improve the quality of stormwater runoff (in the most cost-effective manner).

storm distribution a measure of how the intensity of rainfall varies over a given period of time

Storm Sewer - A system of pipes, separate from sanitary sewers, that only carries runoff from buildings and land surfaces.

Storm Water Management Model (SWMM) - Rainfall-runoff event simulation model sponsored by the U.S. Environmental Protection Agency.

Storm Water Management Model (SWMM) a dynamic rainfall–runoff simulation model developed by the U.S. Environmental Protection Agency in 1971 for analysis of quantity and quality problems associated with urban runoff

Stormwater - Precipitation that is discharged across the land surface or through conveyances to one or more waterways and that may include stormwater runoff, snow melt runoff, and surface runoff and drainage.

Stormwater conveyance system - Any of the following, either within or downstream of the land disturbing activity: (1) a man-made stormwater conveyance system; (2) a natural stormwater conveyance system; or (3) a restored stormwater conveyance system.

Stormwater discharge associated with construction activity - A discharge of pollutants in stormwater runoff from areas where land-disturbing activities (e.g., clearing, grading, or excavation); construction materials or equipment storage or maintenance (e.g., fill piles, borrow area, concrete truck washout, fueling); or other industrial stormwater directly related to the construction process (e.g., concrete or asphalt batch plants) are located.

Stormwater discharge associated with large construction activity - The discharge of stormwater from large construction activities.

Stormwater discharge associated with small construction activity - The discharge of stormwater from small construction activities.

STORMWATER DISCHARGE PERMIT OR STORMWATER PERMIT - A permit issued by the Secretary for the discharge of regulated stormwater runoff to waters that are not stormwater-impaired waters.

Stormwater Filtering (or filtration) - A pollutant removal method to treat stormwater runoff in which stormwater is passed through a filter media such as sand, peat, grass, compost, or other materials to strain or filter pollutants out of the stormwater.

Stormwater Hot spot - An area where the land use or activities are considered to generate runoff with concentrations of pollutants in excess of those typically found in stormwater.

STORMWATER IMPACT FEE – The monetary charge assessed to a permit applicant for the discharge of regulated stormwater runoff to a stormwater-impaired water that mitigates a sediment load level or hydrologic impact that the discharger is unable to control through on-site treatment or completion of an offset on a site owned or controlled by the permit applicant.

STORMWATER-IMPAIRED WATER - A state water listed as being impaired principally due to stormwater runoff on the EPA-approved State of Vermont 303(d) List of Waters.

STORMWATER-IMPAIRED WATERSHED – The total area of land contributing runoff to a stormwater impaired water.

Stormwater management facility - A device that controls stormwater runoff and changes the characteristics of that runoff including, but not limited to, the quantity and quality, the period of release or the velocity of flow.

Deleted: *Stormwater management facility* - A device that controls stormwater runoff and changes the characteristics of that runoff including, but not limited to, the quantity and quality, the period of release or the velocity of flow.¶

Stormwater management plan – A document(s) containing material for describing how existing runoff characteristics will be maintained by a land-disturbing activity and methods for complying with the requirements of the local program or this chapter.

Stormwater Management Program - A program established by a locality that is consistent with the requirements of the Act, this chapter and associated guidance documents.

Stormwater management standards - The minimum criteria for stormwater management programs and land-disturbing activities as set out in Part II of these regulations.

stormwater planter self-contained landscaping areas which capture and temporarily store a fraction of rooftop runoff and filter it through the soil media

Stormwater Pollution Prevention Plan (SWPPP) or plan - A document that is prepared in accordance with good engineering practices and that identifies potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges from the construction site or its associated land-disturbing activities. In addition the document shall describe and ensure the implementation of best management practices, and shall include, but not be limited to the inclusion of, or the incorporation by reference of, an erosion and sediment control plan, a post-construction stormwater management plan, a spill prevention control and countermeasure (SPCC) plan, and other practices that will be used to reduce pollutants in stormwater discharges from land-disturbing activities and to assure compliance with the terms and conditions of this chapter. All plans incorporated by reference into the SWPPP shall be enforceable under the permit issued.

STORMWATER PONDS - A land depression or impoundment created for the detention or retention of stormwater runoff.

stormwater treatment train a suite of stormwater management practices incorporating aspects of pollution prevention, volume control and water quality controls

STORMWATER WETLANDS - Shallow, constructed pools that capture stormwater and allow for the growth of characteristic wetland vegetation.

Stream buffers - The zones of variable width which are located along both sides of a stream and are designed to provide a protective natural area along a stream corridor.

STREAM CHANNEL PROTECTION (CP_v) - A design criteria which requires either 12 or 24 hour detention of the one year postdeveloped, 24 hour storm event for the control of stream channel erosion.

streambank stabilization activities or techniques employed to maintain the integrity or stop the degradation of streambanks due to erosion and sedimentation

Structural BMPs – Any man made stormwater practice or feature that requires maintenance in order to function or provide the hydrologic benefit as designed. Structural practices include, but are not limited to, rain gardens, stormwater bioretention basins, stormwater infiltration facilities, stormwater retention and detention facilities, engineered vegetated filter strips, and any other features that are designed, constructed and maintained in order to managing or influencing the site hydrology and/or improve runoff water quality.

Deleted: Stormwater management plan - A document containing material for describing how existing runoff characteristics will be affected by a land development project and methods for complying with the requirements of the local program or this chapter.¶

STRUCTURAL BMPs - Devices that are constructed to provide temporary storage and treatment of stormwater runoff.

STRUCTURAL STPs - Devices that are constructed to provide temporary storage and treatment of stormwater runoff.

STRUCTURES – Buildings such as houses, businesses, pump houses, and storage sheds and infrastructure such as roadways, culverts, bridge abutments, and utilities.

sub-critical flow – The state of flow when the depth is greater than the critical depth.

Subdivision - The same as defined in §15.2-2201 of the Code of Virginia.

SUBGRADE - The soil prepared and compacted to support a structure or a pavement system.

sublimation the process of transforming from a solid directly into a gas without passing through a liquid phase

SUBSTANTIALLY DETERIORATED - The condition of a stormwater treatment practice that would necessitate repair or reconstruction beyond that which would be considered routine, periodic maintenance for a system of similar design.

substrate – Substances used by organisms for growth in a liquid medium. Surface area of solids or soils used by organisms to attach.

subwatershed a subdivision based on hydrology corresponding to a smaller drainage area within a larger watershed

succession – The temporal changes of plant and animal populations and species in an area that has been disturbed.

super-critical flow – The state of flow when the depth is less than the critical depth. Transitions between super-critical and sub-critical flow may result in turbulence associated with a hydraulic jump.

Surcharge - Flow condition occurring in closed conduits when the hydraulic grade line is above the crown of the sewer. This condition usually results localized flooding or stormwater flowing out the top of inlet structures and manholes.

surface infiltration rate – The rate at which water enters the soil or other porous surface. The measurement of surface infiltration rates requires that the underlying soil be completely saturated and that infiltration occurs by gravity under a unit hydraulic gradient.

Deleted: ¶

Surface waters –

1. All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide;
2. All interstate waters, including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

- a. That are or could be used by interstate or foreign travelers for recreational or other purposes;
 - b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - c. That are used or could be used for industrial purposes by industries in interstate commerce.
4. All impoundments of waters otherwise defined as surface waters under this definition;
 5. Tributaries of waters identified in subdivisions 1 through 4 of this definition;
 6. The territorial sea; and
 7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in subdivisions 1 through 6 of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA and the law, are not surface waters. Surface waters do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other agency, for the purposes of the Clean Water Act, the final authority regarding the Clean Water Act jurisdiction remains with the EPA.

Swale – An open depression or wide, shallow ditch that intermittently contains or conveys runoff. Can be used as a BMP to detain and filter runoff.

swale a wide, shallow, vegetated depression in the ground designed to channel drainage of water

T

tail water condition (minimum and maximum) – The depth of water in the receiving water body at a structure outfall.

Technical Publication 40 (TP-40) U.S. Weather Bureau publication that is the standard reference for frequency analysis in Minnesota

Technical Release No. 20 (TR-20) - Project Formulation - Hydrology. SCS watershed hydrology computer model that is used to compute runoff volumes and route storm events through stream valleys and/or impoundments.

Technical Release No. 55 (TR-55) - Urban Hydrology for Small Watersheds. SCS watershed hydrology computation model that is used to calculate runoff volumes and provide a simplified routing for storm events through stream valleys and/or ponds.

temporary construction sediment control techniques practices employed on an active construction site to control movement of sediment within or off of the site until permanent vegetation or sediment controls can be established

TEMPORARY SEEDING - A seeding which is made to provide temporary cover for the soil while waiting for further construction or other activity to take place.

ten percent rule the downstream point where the development site represents 10% of the total contributing drainage area of a watershed. Downstream hydraulic and hydrologic analysis for the effects of coincident peaks should extend to this point

TEN-YEAR STORM (Q₁₀) - The peak discharge rate associated with a 24 hour storm event which exceeds bankfull capacity and occurs on average once every ten years (or has a likelihood of occurrence of 10% in a given year).

terrestrial – Living or growing on land that is not normally flooded or saturated.

thermal impact the impact to streams and water bodies of stormwater runoff addition which are higher in temperature than the ambient stream or water body temperature. This causes stress or may result in the death of temperature-sensitive organisms such as trout

thermal protection techniques and practices such as infiltration and shading which act to preserve and protect the ambient temperatures of streams and waterbodies from temperature-raising effects of stormwater runoff

Time of concentration - The time required for water to flow from the hydrologic most distant point (in time of flow) of the drainage area to the point of analysis (outlet). This time will vary, generally depending on the slope and character of the surfaces.

TOE (OF SLOPE) - Where the slope stops or levels out. Bottom of the slope.

TOE WALL - Downstream wall of a structure, usually to prevent flowing water from eroding under the structure.

TOPSOIL - Fertile or desirable soil material used to top dress road banks, subsoils, parent material, etc.

Total dissolved solids - The total dissolved (filterable) solids as determined by use of the method specified in 40 CFR Part 136 (2000).

Total maximum daily load (TMDL) - The sum of the individual wasteload allocations for point sources, load allocations (LAs) for nonpoint sources, natural background loading and a margin of safety. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure. The TMDL process provides for point versus nonpoint source trade-offs.

Total Nitrogen (TN) -

total nitrogen (TN) - A measure of all organic and inorganic nitrogen forms in a water sample. Functionally, TN is equal to the sum of TKN and $\text{NO}_3\text{-N} + \text{NO}_2\text{-N}$.

total organic carbon (TOC) - A measure of the total reduced carbon in a water sample.

Total Phosphorus (TP) -

total phosphorus (TP) a nutrient that can also be a contaminant because of its use by nuisance algae

total phosphorus (TP) - A measure of the total phosphorus in a water sample, including organic and inorganic phosphorus in particulate and soluble forms.

Total Removal (TR) is the nutrient mass reduction, which is the product of both Runoff Reduction (RR) and Pollutant Removal (PR).

Total Suspended Solids (TSS) - The total amount of particulate matter which is suspended in the water column.

Toxic pollutant - Any pollutant listed as toxic under §307(a)(1) of the CWA or, in the case of sludge use or disposal practices, any pollutant identified in regulations implementing §405(d) of the CWA.

tractive force – The total cross-sectional force experienced by a rigid channel or conduit as a result of channel flow (expressed in units of force per length). This force tends to displace soil particles, rocks and channel liners in the downstream direction and must be resisted by friction or by structural anchors. The tractive force is equal to the unit tractive force multiplied by the wetted perimeter of the conduit.

transition zone – The area between habitats or ecosystems (see ecotones). Frequently, transition zone is used to refer to the area between uplands and wetlands. In other cases, wetlands are referred to as transitional areas between uplands and aquatic ecosystems.

transitional karst areas underlain by carbonate bedrock covered by 50-100 feet of sediment

transmissivity (in-plane flow capacity) – Rate that water can be made to flow through the cross section of a thin layer or conduit under the influence of a unit hydraulic gradient. Measured as a volumetric rate per unit width (e.g., square feet meters per minute, or gallons per minute per foot). Equal to the hydraulic conductivity times the thickness of the layer or conduit.

transpiration the passage of water vapor into the atmosphere through the vascular system of plants

Transpiration – The process by which water that is absorbed by plants, usually through the roots, is evaporated into the atmosphere from the plant surface, such as leaf pores.

Trash rack - A structural device used to prevent debris from entering a spillway or other hydraulic structure.

Travel time - The time required for water to flow from the outlet of a drainage sub-basin to the outlet of the entire drainage basin being analyzed. Travel time is normally concentrated flow through an open or closed channel.

treatment any method, technique, or practice used for management purposes

Treatment Train – A series of BMPs or natural features, each designated to treat runoff, that are implemented together to maximize pollutant removal effectiveness.

Treatment Volume -

trench a long steep-sided depression in the ground used for drainage or infiltration

Turbidity - Cloudiness of a liquid, caused by suspended solids; a measure of the suspended solids in a liquid.

TWENTY-FIVE YEAR STORM - An extreme flood event which occurs on average once every 25 years or statistically has a 4% chance on average of occurring in a given year.

TWO-YEAR STORM (Q₂) - The peak discharge rate associated with a 24 hour storm event which exceeds bankfull capacity and occurs on average once every two years (or has a likelihood of occurrence of 1/2 in a given year).

type II rainfall distribution – Standard NRCS 24-hour rainfall distribution which applies to the state of Pennsylvania. The distribution allocates rainfall as a percentage of total rainfall over discrete time intervals.

U

Ultimate condition - Full watershed build-out based on existing zoning.

Ultra-urban - Densely developed urban areas in which little pervious surface exists.

under drain An underground drain or trench with openings through which the water may percolate from the soil or ground above

unified sizing criteria statewide criteria for the sizing of stormwater management systems

uniformity coefficient – A measure of the range in particle sizes associated with a granular mixture. Materials with the lowest uniformity coefficients are most uniform. Uniform materials are also called open graded materials. If the uniformity coefficient is less than 4 or 5, the material is considered uniform in particle size. The uniformity coefficient is computed as follows:

$$C_u = (D_{60} / D_{10})$$

D_{60} is the sieve opening size through which 60 percent of the layer material will pass. D_{10} is the sieve opening size through which 10 percent of the layer material will pass.

unit tractive force (or tractive stress) – The stress (expressed in units of force per area) induced by open channel flow on the bottom and sides of its conduit or channel. This stress is responsible for sediment erosion and the downstream transport of streambed materials. The average unit force acting on a channel cross-section is equal to the product of the unit weight of water, the slope of the channel, and the hydraulic radius of the flow.

Unstable - In the context of channels, a channel that is not stable.

upland – An area that is not an aquatic, wetland, or riparian habitat. An area that does not have the hydrologic regime necessary to support hydrophytic vegetation.

Upset - An exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the operator. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

Urban runoff - Stormwater from city streets and adjacent domestic or commercial properties that carries nonpoint source pollutants of various kinds into the sewer systems and receiving waters.

V

Variance - Any mechanism or provision under §301 or §316 of the CWA or under 40 CFR Part 125 (2000), or in the applicable effluent limitations guidelines that allows modification to or waiver of the generally applicable effluent limitation requirements or time deadlines of the CWA. This includes provisions that allow the establishment of alternative limitations based on fundamentally different factors or on §301(c), §301(g), §301(h), §301(i), or §316(a) of the CWA.

VDOT - The Virginia Department of Transportation.

vegetative filters the removal of sediment, nutrients, or pollutants by plant structures

VELOCITY HEAD - Head due to the velocity of a moving fluid, equal to the square of the mean velocity divided by twice the acceleration due to gravity (32.16 feet per second per second).

VESCH - The Virginia Erosion and Sediment Control Handbook, latest edition.

Virginia Pollutant Discharge Elimination System (VPDES) permit - A document issued by the State Water Control Board pursuant to the State Water Control Law authorizing, under prescribed conditions, the potential or actual discharge of pollutants from a point source to surface waters and the use or disposal of sewage sludge.

Virginia Stormwater Management Act or Act - Article 1.1 (§ 10.1-603.1 et seq.) of Chapter 6 of Title 10.1 of the Code of Virginia.

Virginia Stormwater Management Handbook - A collection of pertinent information that provides general guidance for compliance with the Act and associated regulations and is developed by the department with advice from a stakeholder advisory committee.

Virginia Stormwater Management Program (VSMP) - The Virginia program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing requirements pursuant to the CWA, the Act, this chapter, and associated guidance documents.

Virginia Stormwater Management Program permit or (VSMP permit) - A document issued by the permit-issuing authority pursuant to the Virginia Stormwater Management Act and this chapter authorizing, under prescribed conditions, the potential or actual discharge of pollutants from a point source to surface waters. Under the approved state program, a VSMP permit is equivalent to a NPDES permit.

volume control controlling the overall volume or amount of stormwater that is released from a site or localized holding area into the larger conveyance system

VOLUMETRIC RUNOFF COEFFICIENT (R_v) - The value that is applied to a given rainfall volume to yield a corresponding runoff volume based on the percent impervious cover in a drainage basin.

VSMP application or application - The standard form or forms, including any additions, revisions or modifications to the forms, approved by the administrator and the board for applying for a VSMP permit.

W

Walker Method a method for determining sizing for water detention ponds, developed in the upper Midwest to maximize phosphorus removal to protect sensitive lakes from eutrophication

Wasteload allocation or wasteload or WLA - The portion of a receiving surface water's loading or assimilative capacity allocated to one of its existing or future point sources of pollution. WLAs are a type of water quality-based effluent limitation.

water balance A hydrological formula used by scientists and land managers to determine water surpluses and deficits in a given area. Includes inputs such as precipitation; outputs such as evapotranspiration, infiltration, and runoff; and storage within the system

water quality design storm – Benchmark rainfall event, used to develop criteria for the design of water quality BMPs. Water quality design storms are used to size BMPs that are intended to achieve specific quality treatment objectives. Criteria based on water quality storms generally require that the design treatment efficiency be achieved during the water quality design storm and all smaller events. Complete specification of the storm includes rainfall depth in inches, return frequency and storm duration. The distribution of rainfall in Pennsylvania is a type II rainfall distribution. See Section 5.3 of the Handbook.

WATER QUALITY REMEDIATION PLAN or WQRP – A plan, other than a TMDL or sediment load allocation, designed to bring an impaired water body into compliance with applicable water quality standards in accordance with 40 C.F.R. 130.7(b)(1)(ii) and (iii).

water quality sizing tied to the volume of stormwater runoff

Water quality standards or WQS - Provisions of state or federal law that consist of a designated use or uses for the waters of the Commonwealth and water quality criteria for such waters based on such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water, and serve the purposes of the State Water Control Law (§62.1-44.2 et seq. of the Code of Virginia), the Act (§10.1-603.1 et seq. of the Code of Virginia), and the CWA (33 USC §1251 et seq.).

water quality storage – The volume set aside within a BMP to detain storm runoff. The detained water is released over an extended period of time. The water quality storage is frequently expressed as a multiple of the water quality volume.

Deleted: Water quality standards - State-adopted and EPA-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.¶

water quality velocity – The maximum flow velocity encountered in a water quality BMP during the course of the water quality design storm.

water quality volume the permanent pool in a water detention pond

WATER QUALITY VOLUME (WQ_v) - The storage needed to capture and treat 90% of the average annual stormwater runoff volume for sites located within or discharging to high quality water and “hotspot” sites, and 80% of the runoff volume for sites located within or discharging to moderate quality water.

Water quality volume—The volume equal to the first ½-inch of runoff multiplied by the impervious surface of the land development project as defined by the Virginia Stormwater Management Regulations. (?)

Water surface profile - Longitudinal profile assumed by the surface of a stream flowing in an open channel; hydraulic grade line.

Water table - Upper surface of the free groundwater in a zone of saturation.

waters of the State All streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, aquifers, irrigation systems, drainage systems, and all other bodies or accumulations of water surface or underground, natural or artificial, public or private, which are contained within, flow through or under the state or any portion thereof

waters of the United States those waters coming under federal jurisdiction

Watershed - A defined land area drained by a river or stream, karst system, or system of connecting rivers or streams such that all surface water within the area flows through a single outlet. In karst areas, the karst feature to which the water drains may be considered the single outlet for the watershed.

Watershed - The contributing drainage area connected to an outlet or waterbody of interest (NRC 2008).

Deleted: Watershed - A defined land area drained by a river, stream, or drainage way, or system of connecting rivers, streams, or drainage ways such that all surface water within the area flows through a single outlet.¶

WATERSHED IMPROVEMENT PERMIT – A general permit specific to a stormwater-impaired water that is designed to apply management strategies to existing and new discharges and that includes a schedule of compliance of no longer than five years reasonably designed to assure attainment of the Vermont water quality standards in the receiving waters. **WEDGES** - Design feature in stormwater wetlands, which increases flow path length to provide for extended detention and treatment of runoff.

watershed inch a unit of measure corresponding to the volume of water spread out over the entire watershed area at a depth of one inch

wattles – Fence or barrier constructed of interwoven twigs and branches used to stabilize soil from erosive forces.

WEDGES - Design feature in stormwater wetlands, which increases flow path length to provide for extended detention and treatment of runoff.

Weir - A wall or plate placed in an open channel to regulate or measure the flow of water.

weir gate – Water-control device used to adjust water levels and measure flows simultaneously.

wellhead protection area an identified area with restricted or modified land use practices designed to protect the well supply area from the introduction of contaminants

Wet Pond – A BMP designed to detain urban runoff and always contain water.

wet pond a permanent pool of water for treating incoming stormwater runoff
wet vault A wet vault is a vault stormwater management device with a permanent water pool, generally 3 to 5 feet deep

WET SWALE - An open drainage channel or depression, explicitly designed to retain water or intercept groundwater for water quality treatment.

Wet weather flow - Combination of dry weather flows and stormwater runoff.

wetland systems hydrologically interconnected series of wetlands which includes the interrelatedness of habitat, wetland functions, and biology

***Wetlands** - Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.*

***Wetted perimeter** - The length of the wetted surface of a natural or manmade channel.*

***Whole effluent toxicity** - The aggregate toxic effect of an effluent measured directly by a toxicity test.*

wilting point – Quantity of water which will not be removed from soil under normal conditions of evaporation and plant transpiration. Usually measured as the moisture content (by volume) in soil with a capillary tension of 15 bars.

WING WALL - Sidewall extensions of a structure used to prevent sloughing of banks or channels and to direct and confine overfall. 303(D) LIST - The EPA-approved State of Vermont 303(d) List of Waters prepared pursuant to 33 U.S.C. 1313(d).

X

Y

Z

Zero order streams or zero order channels – channels with defined banks that emanate from a hollow or ravine with convergent contour lines and represent the uppermost definable channels that possess temporary or intermittent flow (Gomi et al, 2002, as referred to in NRC, 2008, Chapter 5).

zonation – The development of a visible progression of plant or animal communities in response to a gradient of water depth or some other environmental factor.